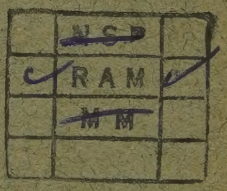
RHODESIA

REPORT OF THE SECRETARY FOR AGRICULTURE

for the period

1st October, 1968, to 30th September, 1969

Presented to Parliament of Rhodesia
1970



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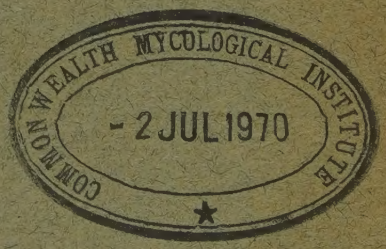

PRINTED BY THE GOVERNMENT PRINTER, SALISBURY
1970

C.S.R. 6—1970] [G.P. & S. 39405—755

REPORT OF THE

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Report of the Secretary for Agriculture

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World agricultural survey

WORLD agricultural, fishery and forestry production increased by about 3 per cent. in 1968, roughly in line with the average rate of expansion over the past 10 years. It is estimated by the Food and Agricultural Organization that this increase is ahead of the world population growth rate of 2 per cent. Production in 1969 is expected to show a similar situation with stockpiles, especially of wheat and dairy products, becoming a more prominent feature.

Wheat production in 1968 reached a new record estimated at some 11 per cent. above 1967, which in itself was 8 per cent. over 1966, the previous high. This situation resulted both from an increase in acreage and national yield. Although it is expected production will decline somewhat in 1969, with a possible increase in world trade in wheat and flour a further build up in stocks is expected. Maize production showed a decline in 1968 over the record 1967 crop and indications are that the 1969 figures will show a further decline. Whilst feed grain requirements in the major consuming countries are expected to increase there are indications that these are being met more and more from increased local production of maize and the use of greater quantities of wheat. Sorghums, barley and oats are of far less importance in world trade and little change is expected in the over-all picture for these grains. Although this year's harvest of rice established a new record the estimated increase of 2 per cent. is well below the 14 per cent. increase in 1968 over 1967. However increased exports are expected to follow and indications are that the high prices which have been a feature during the last two years will weaken.

World cotton production in 1968-69 is estimated at some 52.6 million bales compared with some 47.8 million bales in 1967-68 and the previously recorded record crop of 53.9 million bales which occurred in 1965-66. The main increase took place in the United States and Brazil whilst decreases were recorded in Europe. World trade in cotton is expected to remain at a high level with a slight weakening in prices.

Sugar production in 1968-69 was at a record level of 75.7 million short tons, raw value, representing an increase of 4 per cent. over the 1967-68 crop. This record crop was accomplished despite unfavourable weather conditions in some of the larger producing countries. The International Sugar Agreement became effective, provisionally, on 1st January, 1969, and in May, 1969, at the International Sugar Council Meeting in London, quotas were established. Available supplies are expected to exceed requirements, but it is apparent with the considerable rise in sugar prices since September, 1968, that a more settled situation now exists within this sector.

The United States, by far the world's largest exporter of tobacco continued to dominate in this trade with 599 million pounds exported, which represented one-third of the world's total during 1968. Free World imports of tobacco reached an all-time record in 1968, the total amounting to 1,798 million pounds. Increasing demand for world tobacco brought about keener competition among major exporting countries with an indication of certain shifts in traditional patterns of tobacco trade as some countries appeared to be turning to alternative sources of supply. The pattern of trade continues to be affected by sanctions against Rhodesia. World cigarette consumption continued to increase during 1968, and there are indications this trend is continuing in 1969. Prices continued to be firm.

Of the three major oilseeds, groundnuts, cotton seed and soya bean, world production of groundnuts in 1968 was the lowest since 1962, mainly accounted for by a sharp drop in production in India. Both cotton seed and soya bean production showed substantial gains the former only being estimated at 1 per cent. below the previous record whilst soya bean production reached a new record level. Indications are that production in 1969, for all three oilseeds will show increases. Prices for both groundnuts and groundnut oil throughout the first half of 1969 were sharply above 1968 levels and this trend is expected to continue until the availability of the new crop. In the case of cottonseed and soya bean prices have been fairly static although with increased supplies available prices are expected to show a downward trend. However, due to the degree of substitutability between oilseeds production levels trend to have a lower effect on prices than is found for other commodities.

Citrus production over the 1968 season indicates another record year. In the case of oranges production is estimated at 668.1 million boxes—almost 18 per cent. above the previous year. Grapefruit production is expected to rise by some 11.8 million cases to an all-time record of 72 million cases. Lemon production was up 8 per cent. over 1967, reaching close on 58 million boxes. Forecasts indicate a similar trend for the 1969 season.

In response to continued growth in world demand for meat and meat products, world meat supplies continued to expand in 1968. Total meat production reached a new record level being 16.9 per cent. above the 1961-65 average and 2.6 per cent. above 1967. Since the early 1960's meat production has risen steadily and at a rate faster than world population. A further increase is expected in 1969, although at a silghtly reduced rate than that for 1968 over 1967. The main increase is expected to be accounted for by beef and veal. World beef prices remain firm. World pork production is not expected to show much change in 1969, as world pig numbers are tending to decline. Lamb, mutton and goat production is expected to be down somewhat in 1969, following the slaughter of larger numbers of breeding stock in 1968, resulting in a smaller lamb crop in 1969. World beef and veal production registered a 2.8 per cent. increase in 1968 over 1967, whilst the increase for pork amounted to 2.4 per cent. and that for lamb, mutton and goat meat production some 3.2 per cent. Prices for pork meat remained somewhat depressed whilst for lamb and mutton prices were somewhat static but firm.

World milk production has shown an increase annually since 1964, and in 1968 an increase of 2 per cent. over 1967 was recorded. Increases in 1968 were recorded in almost all of the major milk producing countries although declines were recorded for Denmark and the United States due to a decrease in cow numbers and in Australia and New Zealand which resulted from drought conditions and lack of feed supplies. Major surpluses especially of butter and milk powders remain evident in spite of efforts to increase consumption through lower prices, export subsidies and increases in the butter fat content of milk. Prices for dairy products can generally be regarded as depressed.

World production of poultry meat in 1968 remained at that for 1967, some 8 million tons, although imports by the major importing countries showed an increase of some 10 per cent. Egg production and trade followed a similar trend. Production and trade in respect of both poultry meat and eggs, are expected to show slight increases during 1969, with little change in price levels.

Although production and trend levels in 1968 showed, on the whole, increases over 1967, and forecasts indicate increasing levels for most commodities in 1969, the general trend has been one of no increase in the over-all value of trade in agricultural products in 1968. This means the value of world farm exports has now remained virtually unchanged for four years while that of world trade as a whole has grown at a rate of about 8 per cent. a year since 1964. World bodies including the Food and Agricultural Organization and the Organization for Economic Co-operation and Development have recently reported on this development and cited various reasons for such stagnation. These included agricultural price supports and protectionism; competition by synthetic products and the reaching of saturation levels of consumption of many commodities in importing countries. At the same time it is reported that perhaps two-thirds of the world's people live in countries which on average don't have enough food to give everyone nutritionally adequate diets. This position is likely to intensify unless world population trends over the next few decades show a marked decline. On the surface the solution appears somewhat simple, a more equitable distribution of world agricultural production. However such a measure would indeed be costly, the free transportation and distribution of surplus stocks to these countries in need puts a heavy burden on the whole economy of the supplying country and doubtless this cannot be carried indefinitely. An alternative could be by providing a trading atmosphere which allows the needy countries to earn the necessary foreign exchange to pay for its essential needs but such an atmosphere could only come about by alternatives to the present costly policies in developed countries. These are not easy either to design or implement but in the long run such adjustments may become inevitable.

On the trends indicated one cannot be very optimistic as to the future position for agricultural trade. Certain sectors are more buoyant than others as indicated by the beef situation relative to that found in respect of cereals and dairy products, but such situations can change rapidly in the short term. The basic problem has been and will continue to be one of finding export markets at satisfactory prices which will enable the primary producer to receive a fair reward for his efforts.

Due to the continuing application of mandatory sanctions against this country it remains necessary to withhold a great deal of statistical information in this report. This action is regretted but necessary under such conditions.

Seasonal review and market conditions

Following what is now generally regarded as the worst agricultural season, climatically, for the country, the 1968-69 season opened on a more satisfactory note and continued favourably over most of the country. During February conditions deteriorated, the country in general experiencing a dry spell of some three weeks. Fears were expressed that once again the ravages of drought were to be the outcome but fortunately these fears were dispelled with the onset of further rains. However, certain pockets of the country were less fortunate and the season in these cases was far from good. A further drawback was experienced through the rains continuing into the latter end of the season. Whilst over-all production levels were at a new high the peculiarities of a mid-season dry spell coupled with a prolonged rainy season created harvesting problems and to some extent a much wider variation in the quality of the crops produced.

Tobacco

For the 1968-69 season Government support was at a level which would cover the production of a flue-cured tobacco crop of 132 million pounds at an average price of 25 pence per pound, a burley tobacco crop of five million pounds at an average price of 25 pence per pound and a samsun tobacco crop of one million pounds at an average price of 26 pence per pound. In April of this year a statement was made concerning the level of support for the 1969-70 tobacco crops. No change was made in respect of the flue-cured and burley tobacco crops although there was the possibility that an increase in the burley crop may be possible at a price to be negotiated. In the case of the samsun tobacco crop it was regretted that support for this crop would be withdrawn, but it was hoped that where ecological conditions permitted advantage would be taken by growers to move into burley production.

Maize

An announcement in June, 1969, that producers would receive an extra 10 pence per bag for maize from the 1967-68 crop meant that the final producer price for this season amounted to 32s. 7d. per bag. For the 1968-69 crop, which can be described as a bumper one, the initial price was announced at a level of 30s. per bag for Class A maize. However it must be stressed that such a price level in respect of the large anticipated crop was largely occasioned through fortuitous circumstances. Agricultural conditions in South Africa were poor and the placing with Rhodesia of an order for some seven million bags at a price of 32s. per bag was indeed a fillip within the over-all price calculation. A change from normal policy was introduced this year in that a pre-planting producer price for Class A maize has been announced for the 1969-70 crop at a minimum level of 25s. per bag.

During the year the Maize Price Agreement was renegotiated following the termination of the previous three-year agreement, which expired on the 30th April, 1969. The main change occurred in the duration of the new agreement and the annual period covered. The new agreement provided for a review before the 1st October, 1969, and the continuation of the agreement or any modification to it for each succeeding 12 months for an indefinite period. Notice of termination or modification has to be made before the 30th September in the year of a current agreement. The annual period covered is now October to September as against May to April.

In August of this year the maize bulk handling depot at Concession came into operation and deliveries by producers in bulk was above expectation although this probably resulted from the lateness of the season which afforded producers the benefit of delivering in this manner. Bulk handling operations continued at the Aspindale depot and the expansion of bulk handling facilities elsewhere are contemplated.

Cotton

Continued expansion in this crop took place this year a feature being the increasing role played by the African sector. Whilst yields on average were up there is evidence that the peculiarities of the season had an effect on quality. Ginning facilities proved adequate although it was unfortunate that delivery quotas had to be introduced to even out the intake at depots. To offset the financial repercussions of such delivery restrictions provision was made through the Cotton Marketing Board for producers to receive payment for seed cotton prior to delivery. Producers responded well to such arrangements and their assistance was greatly appreciated.

On the 1st March, 1969, the Cotton Marketing Board was established. This Board replaced the Cotton Marketing Committee which was an advisory committee appointed by the Minister, although in practice it administered on behalf of the Grain Marketing Board the Government Cotton Agency. The new Board falls under the Agricultural Marketing Authority and works in close contact with the Grain Marketing Board.

Due to the forecast market and price conditions and estimated production levels it was found necessary to reduce the producer price for seed cotton this year. For A Grade Albar the price was reduced to 8d. per lb. and that for Deltapine to 7¾d. per lb. A deduction of 1d. per lb. on these prices was made for machine picked cotton. For the crop to be grown in 1969-70 a minimum pre-planting price of 7½d. per lb. for Grade A Albar cotton was announced with corresponding deductions from this figure of ¼d. and 1d. per lb. for Deltapine and machine picked cotton.

In the light of such price changes producers should once again take note of the caution expressed last year. Production plans should take into account problems which have arisen due to location and soil type and the availability of labour.

Wheat

In creased acreages were planted and whilst it is early to assess results it appears that production levels will be up.

The price of 67s. 6d. per bag continued in force although agreement was reached that for the two varieties Karoi and Mexican 16 which produce wheats of a high baking quality a premium of 4s. would be paid.

New marketing arrangements were concluded resulting in wheat being declared a designated product under the Agricultural Marketing Authority Act and to be handled and graded as a designated product by the Grain Marketing Board as Governments agent.

Price negotiations in respect of the 1970 future crops were in train at the end of the year.

Sorghums

Little change in the production levels were noted although it is expected the crop will meet malting requirements. Increased producer prices were paid for this year's crop to a figure of 35s. for A Grade. This price has been announced as a minimum pre-planting price for the coming season.

Rice

Although plantings were reduced this year yield levels were more than double those obtained in 1967-68. However production still fell short of local requirements. Continuing interest is apparent and there is every indication that self-sufficiency will be accomplished in the near future.

A producer price of 5d. per lb. for paddy rice was paid and it is expected a similar price level will pertain for the following and future crops. Processing facilities are adequate for the anticipated crop levels.

Oilseeds

Increased interest in the production of soya beans, groundnuts and sunflower seed was apparent this year and it is pleasing that the incentive prices payable in respect of the two first-named crops are proving of value. It is of interest that yields of soya beans emanating from a competition held this year were well above past national levels and if such yields can be maintained, the future of this crop should be assured. Increased interest is being shown by expressors for sunflower seed.

Incentive prices in respect of groundnuts and soya beans remain operative for the coming season.

Fruit and vegetables

Fruit production was well maintained and expansion has continued. It was necessary to warn growers that over production of dessert peaches was likely in the immediate future and that, at present, no further plantings should be made. Canning peach crops increased, but supplies were insufficient. Apple crops were fairly good but sufficient only for some five months' supply. Citrus plantations showed a good recovery from frost damage but crops were below average. Plantings of grape vines showed a marked increase and here again the dangers of over-production are possible. Sub-tropical fruit growing continued at a moderate level and increased planting of nut trees occurred.

Fresh vegetables were generally in good supply, although seasonal fluctuations occurred. An encouraging improvement in the expansion of pea production for processing was seen.

In the sphere of marketing seven types of deciduous fruit were designated under the Agri-

cultural Marketing Authority Act and steps are now under way to improve statistical information in respect of these crops. In January, compulsory grading and packing regulations were introduced for ware potatoes and a levy was introduced and collected through the medium of potato pocket labels. The Deciduous Fruit Growers' Co-op. did much of the marketing of growers' fruit.

Beef

Published statistics show an increasing national cattle population despite past unfavourable climatic conditions. This is a healthy sign and possibly indicates that producers are employing to a greater degree sound cattle management. A disturbing feature was, however, the high level of cows in calf sent for slaughter which, if this trend continues, could be detrimental to the industry. In general the future for the industry appears good.

No change occurred in the pricing and grading schedules although a supplementary payment of 4s. per 100 lb. c.d.w. was paid on cattle delivered to the Commission during 1968.

The scheme whereby poducers contracted to supply the Commission with chiller grade stock over the December-January period at a price of 20s. per 100 lb. c.d.w. above the scheduled prices was well supported and should go a long way to evening out offtake of this grade of beast during what in the past has been a low offtake period.

Work on the new abattoir at Gatooma is well up to schedule.

Dairy

Whilst there was a significant fall in production over the period July-September this year compared with the corresponding period in 1968, total production over the year showed a further increase. There were indications, however, that production levels were increasing by early October.

Producer price levels were reduced with effect from January to give an annual average price of just over 34d. per gallon compared with just over 36d. per gallon the previous year. However, there is a distinct possibility that a supplementary payment will be made in respect of the year 1968-69.

Although sales levels by the Dairy Marketing Board were improved, they did not compensate for the increased level of intake. This appears to be the situation for the coming year, so prospects for an improvement in the producer price appear remote.

Poultry

During the current year egg and broiler production from registered producers has again increased by some 25 per cent. and 35 per cent. respectively.

Despite the enthusiastic formation last year of the Commodity Association for the specific purpose of market organization, it has not proved possible to find an effective method of collecting levies so as to provide finance for the Association and as a result it has not yet become an effective organization. However, new legislation presently being drafted should rectify the position.

Pending the ability of the Association to institute co-ordination in marketing, price cutting continues, particularly in eggs, to the extent that some producers are falling out.

Despite lower prices, the total value of poultry sales has again increased to approach the £2½ million mark. This trend is fostered by the medium scale producer expanding in anticipation of a low margin/big volume throughput to maintain income. This trend aggravates the market situation.

Pigs

Little change was seen in the over-all situation although price levels for most grades of pigs were reduced to the minimum level over the year. Marketing arrangements through Colcom continued satisfactorily.

Sheep

Further increases were noted in this sector and it is apparent that, at present producer and retail price levels, the situation of self-sufficiency is fast approaching. However, per capita consumption of mutton and lamb is not high by world standards and there is room for possible expansion provided quality and price meet the consumer's needs.

Present producer prices have done much to stimulate production and whilst these have continued unchanged over the last few years, their continuation at present levels may necessitate examination in the light of future expansion.

Chinchillas

Recent developments in marketing have indicated that the chinchilla industry will be lifted from its depressed state. A pelt producer co-operative has been established and the pelt marketing board is continuing to collect and

despatch pelts. Several research projects are now in train on a number of farms.

Apiculture

Increasing interest has been shown in beekeeping and estimates of controlled honey production show an increase of 50 per cent. over the previous year. Whilst the local supply position is further improved, demand still remains unsatisfied, especially in the manufacturing field.

Farm incomes and costs

The financial state of the agricultural industry was significantly affected by the severe drought conditions of 1967-68. Gross farm incomes in the European sector fell by almost 50 per cent. from the 1966-67 level. Although drought relief was afforded, it was a fact that farmers had to carry the first 20 per cent. of the loss in income. Even so, farmers benefited from the award of drought relief assistance to the extent of some £2,490,000 in the case of the European farming sector and some £414,000 in respect of the African Purchase Areas. Gross incomes per farming unit declined from some £3,600 to £3,300 in 1967. In 1968 this fell to a figure of £1,600 but was directly attributable to the drought. Prospects for 1969 are indeed much more favourable but there is a heavy backlog of debt which has to be reimbursed.

Although the output from the farming sector has remained fairly static over the past few years, the farm input bill has been moving upwards. In 1967-68 a 3 per cent. increase over the input account for 1966-67 was registered. The main factors accounting for this increase were African wages, fertilizers, insecticides, animal feedstuffs and seed. The aggregate increase in these input items was due in the main to increased usage. Nevertheless, the price of certain inputs did increase over the year.

For an industry which is ever faced with the so-called "cost-price squeeze", the importance of expanding the productive capacity of all resources cannot be over-emphasized. In the contrast, the disastrous effects on output by the 1967-68 drought resulted in a sharp fall in productivity. The fact that Government came to the assistance of the drought-crippled industry indicates that it accepts, within the limits of its resource capacity, that the agricultural industry must be cushioned from the effects of climatic hazards. In contrast to this acceptance of limited responsibility for natural climatic hazards, the agricultural industry must appreciate Government's reluctance to isolate the farmer from the market place and the price variations that occur therein.

The drought and the associated severe reduction in farm income resulted in a sharp rise in farm indebtedness. The amount of credit extended to the industry in March, 1969, was 15 per cent. up on the amount for the same period in 1968. Much of this increase was no doubt due to finance borrowed for "carry-on" purposes. The net debt position in March, 1968, represented a sum far in excess of the total farm income for 1967-68.

It is hoped that the improved farm income position anticipated for this current season will increase the general liquidity of the farming sector. This should have the effect of reducing farm indebtedness.

The declining trend in farm incomes does not appear to be confined to this country alone. The table below sets out comparable data for certain selected countries for which information of this nature is available:

A COMPARISON OF THE FARM INCOME POSITION FOR SELECTED FOREIGN COUNTRIES (£R)

Country	Income determinants	1965	1966	1967	1968
Rhodesia	Gross income/farm . .	3,304	3,122	3,289	1,580
U.K.	Net income/farm . . .	2,044	1,832	1,639	1,929
U.S.	Net income/farm . . .	n.a.	n.a.	n.a.	1,616
Netherlands	Average farm income . .	1,101	999	1,074	n.a.
Australia	Total farm income (million)	1,063	858	1,117	714
W. Germany	Total farm income (million)	742	649	679	689

There is no doubt the "cost-price squeeze" is a situation not uncommon in the agricultural industries throughout the world. Correcting such a situation is not easy and possible solutions vary within the circumstances pertaining to a particular country. In Rhodesia a basic fact to be contended with is the size of the local market which is small relative to the production potential, hence the greater reliance on overseas markets. Prices here can show marked fluctuations, depending on the over-all supply and demand situation and at times the level of tension in the world political situation.

Whilst prices in internal markets can compensate falling world prices to a degree it is certainly not possible in Rhodesia for internal prices to be raised to meet the over-all price reductions which occur with increasing production levels leading to greater export quantities. If internal prices were to rise in sympathy one would be best by the counter factors of consumer resistance, substitution and inflationary spiral.

Subsidization is often quoted as the cure for the cost-price squeeze. However, subsidies in themselves can bring harm to an industry through the creation of artificial conditions which generally cannot be maintained indefinitely due to the over-all economic situation within the country. When reality is thus brought home, the farmer can find himself ill-equipped to withstand the competitive situation. This is not to say that all subsidies are detrimental to a progressive industry and many cases could be cited where the injection of initial subsidies have put a sector on its feet. It is the continued reliance on such where the danger lies.

Despite claims to the contrary it is true to say that the degree of support to the agricultural industry has maintained its important position in the over-all economy. In addition the farming sector itself has taken great strides in countering rising costs through increased efficiency and greater output per acre. Unfortunately, however, it is the incalculable seasonal conditions which bear heavily on output levels. These in turn determine unit costs and, where exportable surpluses are involved, e.g., maize, the producer price and thus the farm income. Government can, and has in the past, alleviated to some extent the effects of serious drought, protected the local market and assisted in maintaining at a reasonable level the cost of input items. The farmer must also play his part in exploiting the resources available to him in pursuing the objective of maximum yields consistent with forecast price levels. High cost production through bad management or decision-making cannot be accepted as a reason for increased prices and, if it were, would seriously undermine the viability of the industry.

Administration and structural changes

The review period saw a number of changes in this respect. From July the activities of the Co-operative and Loans Branch and the Agricultural Loan Fund were transferred to the Ministry of Internal Affairs, as also the activities of the Department of Conservation and Extension related to Tribal Trust Lands. These moves, involving the transfer of a number of administrative and professional personnel, were not undertaken without prior serious consideration by Government and although problems arose the transfer was successfully completed. It is early days to assess the results but indications are that with greater direct control over all activities relating to a specific sector of the country, benefits will accrue.

A new Branch of Agricultural Land Settlement also came into being from July. The activities of this Branch will be wide-reaching in both the European and African sectors and here again a greater degree of control, for what is an important aspect of agricultural development, should prove of great benefit in the future. A new Branch of Agricultural Education was also established within the Department of Research and Specialist Services to co-ordinate activities in this field.

In the field of development and finance the Minister of Agriculture announced the proposed creation of two further statutory bodies—the Agricultural Development Authority and the Agricultural Finance Corporation—which will orientate the planning and co-ordinate a productive policy to develop farming resources to maximum potential. The function of the A.F.C. will be to co-ordinate the many sources of credit available from the Government to the agricultural sector and may control all Government sources of agricultural finance such as the Land Bank, Farm Irrigation Fund and the Agricultural Assistance Board.

Together with such other bodies as the Agricultural Marketing Authority, the above changes and the active measures contemplated to place the co-ordination of research on a sounder basis it can be said that Government is making a determined attempt in the fields of marketing, development, finance, research and education to place agriculture in a position where it is better able to withstand the constant changes occurring both in the local and export markets.

Agricultural education

Although mention was made concerning the establishment of a Branch of Agricultural Education, this in no way inferred that agricultural education had long been neglected. With continuing growth and advancement in any discipline it became necessary for a degree of specialization to emerge, although over-all control is still exercised through the Director of Research and Specialist Services.

In addition to its responsibility for the two agricultural colleges, Gwebi and Chibero, and the Esigodini Institute of Agriculture, the Branch assists in the administration of the Farmer Training Scheme which was inaugurated in March of this year.

The Branch has strengthened the existing close contact with the University College of Rhodesia,

and with the Ministry of Education in respect of the control and administration of agricultural scholarships and bursaries, through this Ministry, while it will be future policy to build up a comprehensive record of all facets of agricultural education in Rhodesia, and maintain a viable working relationship with the institutions concerned.

Detailed results of the colleges and institute are included elsewhere in this Report.

Land settlement

Although this Ministry was involved in the function of land settlement largely in an advisory capacity, the responsibility and policy for such lay with the Ministry of Lands. With the establishment of the Branch of Agricultural Land Settlement under the control of this Ministry a much greater degree of involvement is now possible.

The responsibilities of the Branch include such activities as: ascertaining potential of Crown Land for settlement; present settlement schemes and their financing; infrastructure development on Crown Land reserved for settlement; Rural Land Board and sub-committees; Wengi Proving Unit; inquiries regarding land for settlement and compilation of leases and collection of rentals from lessees.

To be a success, land settlement schemes must ensure as far as possible that the settlers taking up farming units are well equipped in all aspects to do so and, most important, that from their own efforts they are placed in a position where a fair financial return can be expected; in other words, that the units are viable not only under present circumstances but will remain so under changing conditions. To this end a new policy for future land settlement schemes is being devised in collaboration with other interested parties. In conjunction with this policy formulation and flowing from the principles included therein, a report is in the course of preparation covering the establishment of a settlement scheme within the area presently under the jurisdiction of the Sabi-Limpopo Authority.

Farm Irrigation Fund

Demands on this Fund during the financial year which ended on 30th June, 1969, exceeded its resources. Seven of its 10 regional committees, having fully disbursed the funds available to them, had to open "waiting lists" and even then three of the Mashonaland committees had to close these lists against further applications as demand outstripped their anticipated financial allocation for the year 1969-70. The backlog has now been dealt with and all committees are again open for application, but a certain loss of momentum has resulted.

During the period under review, 161 loans were approved, bringing the total of approved loans to 1,128 since the inception of the scheme in June, 1966. Expressed in cash the 161 loans amounted to some £300,000, bringing the total amount awarded by the end of September, 1969, to £2 million. Total resources available until 30th June, 1970, are £2.3 million, so it can be fairly anticipated that demands in the current financial year will again not be met—this despite the fact that the Fund is starting to revolve as planned with repayments to the end of September, 1969, approaching £40,000. This sum has been made available to regional committees for re-allocation.

It is of interest to note that one-third of the loans provided during the year were for stock-watering points, the balance for storage and the exploitation of water for irrigation purposes.

Rhodesia Freedom from Hunger Campaign

This has been a year in which the Campaign's most successful effort, the Well Baby Clinics, really paid dividends in the form of providing assistance where it was most needed in a time of drought. In consequence of it, despite hardships until the season's crops became available, R.F.F.H.C. found no requirement to start special feeding schemes such as the "Children of the Drought" scheme of 1966-67. Parents now mostly pay 75 per cent. of the cost of milk powder and other protein foodstuffs distributed through clinics.

The Campaign has been successful in securing financial support from the Oxford Committee for Famine Relief to ensure the continuation of the Well Baby Clinic scheme until 1971. In addition, that organization was kindly forthcoming with funds for the purchase and running of a mobile clinic to carry this project and the work of others, into the more remote areas.

The enthusiasm of the Regional Committees set up by the Campaign throughout the country continued unabated and a considerable number of projects of a diverse nature are being carried on with success.

With the transfer from this Ministry of responsibilities in the Tribal Trust Lands as from the 1st July, 1969, it was agreed that sponsorship of R.F.F.H.C. should be transferred to the Ministry of Health which holds country-wide authority and is particularly interested in nutritional matters which have been very much the concern of the Campaign in recent times.

Staff

The ability to recruit and retain professionally qualified staff is a matter of grave concern. We have a substantial number of vacancies in all our professional and technical departments and the demands upon existing staff are growing all the time. Our services are stretched and in our endeavours to meet all requests, not only is a severe physical strain being placed upon personnel, but too much unproductive time is being spent in cars because of the very large areas which individual officers are being forced to cover.

Improvements in conditions of service have been made but in my opinion the salary level is not the root cause. Shortage of skills is not peculiar to agriculture. Other sectors have the same problem. Indeed, so do other countries. I regret I have no recommendation as to how this position can be rectified in the short term. Advertising goes on all the time. Bursaries and scholarships are available and being taken up. This, however, is a long-term effort. Contract terms are available for the more mature man where normal conditions of service which are devised to offer younger men a career are unsuitable. Notwithstanding these measures, there are no signs of an early easing of the position.

Profitability of farming

In my opinion there is no doubt whatsoever that the margin of opportunity for profit in agriculture has narrowed substantially over the last few years. This opinion is based upon a survey undertaken by the Economics Branch of the Ministry. Even after making allowances for the consequences of the 1967-68 drought it is quite evident that not only has the profit opportunity decreased but that in comparison with other sectors of the economy, agriculture has fared badly.

I believe it would be well to draw attention to certain basic facts which the agricultural industry has to face. As I see them, these are—

(a) lack of effective control over production levels. The weather is the dominant factor here. The point is, however, that whether the crop be big or small, the production cost is much the same;

(b) lack of flexibility in adjusting the selling prices of agricultural products. In the main, these are foodstuffs, and because of the relatively small proportion consumed internally, a meaningful adjustment of selling price would have to be so large as to introduce a host of problems;

(c) lack of influence over world market prices. It must be remembered that much of the competition on world markets comes from the great and highly industrialized nations which subsidize farm production to an enormous extent;

(d) increasing costs of items of production about which little can be done because much of the increase is imported.

One hears remarks to the effect that agriculture should stand on its own feet. This is idle talk. No industry can or should carry the inefficient, but without Government intervention the points I have listed above will operate to an extent where not even the most efficient can survive unless agriculture as an industry shrinks to the point where production is little more than the demand in the internal market. The effect on development generally is only too obvious.

If this generality is accepted, the real question is how much support should be given and how best should it be applied. The answers will vary from time to time according to circumstances but the point which I wish to make as positively as possible is that, in addition to research, extension, educational and marketing services, other forms of assistance cannot be avoided. This is not to say nothing has been done in this regard. A good deal has—but it is not nearly enough. I drew attention to this in my last Report.

Land deterioration

Much publicity has been given to the deterioration of the veld and there is substance in this. Considerable attention is being given to this matter, particularly by the Department of Conservation and Extension. Also the awareness of the community generally has been awakened as never before. I believe that very necessary assistance can be given by way of special conditions for fencing and stock watering point loans, plus a bonus or subsidy in connexion with bush

encroachment measures, provided a qualification is that the applicant has instituted and is implementing a sound system of veld and animal management.

I am also of the opinion that propaganda and incentives will only go a little way towards improving the position and that the only really effective method is to tie in ownership of land with a responsibility to maintain it and not abuse it.

Acknowledgements

I wish to place on record my sincere appreciation of the loyal and conscientious work of all members of the Ministry. As I have pointed out, the staffing position in the professional and technical departments is acute, and existing staff has worked extremely hard to cover the gap.

The liaison and co-operation with statutory boards, other Ministries, and farmer organizations has been good and it gives me pleasure to acknowledge gratefully the ready help always freely given.

Following on the good season, a particularly heavy task was laid upon the Rhodesia Railways. On behalf of the Ministry of Agriculture, I would not only like to thank them but also to express our admiration for the way they handled agricultural traffic.

R. A. GRIFFITH,
Secretary for Agriculture.

Economics and Markets Branch Report

for the period 1st October, 1968, to 30th September, 1969

FOR the first time in many years, the full functions of the Branch reverted to being under the direct control of the Chief Agricultural Economist. There is no doubt that the new organizational structure has been successful in that it has allowed a much closer co-ordination of staff and functions thereby avoiding the pitfalls often met under conditions of control at a distance. For organizational purposes the Branch can be regarded as comprising three sections, namely, policy, development and trade; production economics; and farm management research.

Be it the aftermath of serious drought conditions or a favourable season the problems associated with agricultural production remain many although their context may differ. Of major concern is the effect of such seasonal factors on the well being of the farming community. To this end the activities of the Farm Management Research Section, together with the field surveys undertaken by officers of the Production Economics Section, have been directed. This work, which is a continuing exercise, aims amongst others, at establishing trends in the sphere of farm profitability on an individual, group and national basis.

Farm management research

Comprising of three professional officers and four analysts, together with temporary employees, normally university students employed during the long vacation, the work of this section has continued to expand over the review period. There is no doubt that the results emanating are proving of increasing value, both to the individual co-operators and the Ministry as a whole. However, with the relatively small sample of farms which the section is able to handle compared with the national total and, therefore, the limited sample size relating to any specific commodity, the situation is far from satisfactory. Continuing steps are being taken to streamline the operations thereby allowing for a greater number of co-operating farmers to be included within the available resources. With the emphasis on diversification, both in crop and livestock production, the necessity to have available information which can indicate the viability of such production is essential. Such information requires research at the farm level and this, unfortunately, under present circumstances necessitates selectivity of farms to give the widest coverage possible of area and type of production.

During the year, 77 individual farm business analyses covering the farming year 1967-68 were completed together with the economic assessments for these farms. For the 1968-69 farming year it is hoped this figure will reach 100 with the possibility of the total being 137 for the following season. Even at this latter figure this only represents approximately 2 per cent. of the total farming propositions in Rhodesia. Nevertheless an increase of 51 per cent. in the number of analyses completed was achieved when the 1965-66 results are compared with those for 1967-68. Every effort will therefore be made to maintain this growth rate until a satisfactory sample is achieved. Useful assistance in stimulating farmer and advisory service interest in Farm Business Analysis was obtained by the co-operative efforts of the newly formed Farm Management Extension Service of the Department of Conservation and Extension.

Discussion group results were completed for 19 areas and in addition, a number of long-term forward plans were prepared for individual farmers. As a new method of approach five case study articles were prepared in collaboration with officers of the Farm Management Extension Service and published in the agricultural Press. It was pleasing to note from correspondence the interest these articles stimulated.

Further publications in booklet form, either published or at the pre-printing stage, were the 1966-67 Tobacco and Maize Management Standards and the 1967-68 Farm Management Data.

Interest in farm management was further stimulated through the participation of one of the farm management economists at the one-day seminars on this subject arranged by the Rhodesia National Farmers' Union. Several lectures to Purchase Area farmers on livestock records and analysis were undertaken and one three-day farm management course for the senior students at the Gwebi College of Agriculture was also organized.

During the year it was found possible for one of the farm management economists to undertake

a study tour overseas in order to keep abreast of developments in this important aspect of agriculture in other countries.

Field surveys

With the termination last year of all commodity cost-of-production surveys, the Branch instigated what is commonly called an Input/Output Survey with the objective of determining trends in the financial state of farming. Unfortunately, farmer response to this survey was disappointing and only some 60 results were obtained. However with an improvement in the over-all staff position, it is intended to concentrate more effort in this direction as it is apparent from farmer reaction that a survey of this nature can be an eye opener to individuals. The simplicity of this type of survey means that a far greater number of farmers can be catered for and it is hoped a better response to our approaches in the future will be forthcoming.

As the necessity arose additional ad hoc surveys were instituted. Information from this type of survey is not available from the farm management data due to the specific nature of the commodity in question. Examples of such surveys undertaken included those covering seed beans and winter wheat. In addition the survey undertaken into the cost of production of seed maize which was terminated following the publication of the results for the 1966-67 season has now been reinstituted and information will be collected relating to both the 1967-68 and 1968-69 crops. The report covering the cost of production of flue-cured tobacco in the year 1966-67 was published early in the year.

Specific investigations were also undertaken on behalf of other Ministries and departments and included the coffee settlement and the Mchingwe irrigation schemes.

A start was made this year on investigations into specific subjects closely related to agriculture, e.g., credit, diversification, contract services, etc. The first of these covered contract services as regards crop spraying and a useful report was produced. Unfortunately following the preparation of the first report the officer involved resigned and to date it has not been found possible to continue this investigation. However, it is the intention to pursue this line of investigation as soon as possible.

The more detailed survey work which has been undertaken in African areas over the past few years has now been completed and a report on the results obtained is nearing finality. Mention was made in my report for the year 1966-67 that an economic survey among African farmers on the Nyamaropa Irrigation Scheme was being undertaken by a graduate to whom financial assistance was given by this Ministry. It is pleasing to report that copies of his thesis have now been received and make a valuable contribution to our knowledge on such schemes.

General

Apart from the activities of the Branch given earlier, officers have continued to be heavily involved in work to which one may give the omnibus title of agricultural development. Membership of committees is a constant duty together with the work flowing from such membership. Committees can generally be classified at present as covering transport, labour, trade, handling facilities, agricultural assistance, metrication and irrigation. In the transport field provision of short- and long-term forecasts together with the co-ordination of agricultural development plans in terms of transport requirements and liaison between individual commodity sectors with over-all transport authorities can be cited. Although in the context of international trade present circumstances limit the degree of participation, it may be added that such circumstances have increased the over-all trading relationship with neighbouring countries. Work in this direction is largely advisory. Investigation of new projects and assessment of such in relation to the agricultural sector, currency control, pricing policies and assessments as to the financial state of the agricultural industry are other aspects of the general work undertaken. Publication of the Quarterly Markets Report, the scope of which has been increased, continued.

In dealing with many of the subjects cited above, close liaison is exercised between officers of the Branch, the Agricultural Marketing Authority, other Ministries and Statutory organizations.

Staff

The question of staff was a continuing problem throughout the year although there were signs towards the year end that the Branch was reaching a more stable situation in this regard. However only time will tell.

The Branch was unfortunate to lose on promotion the services of one of its senior agricultural

economists who became head of the newly-created Branch of Agricultural Land Settlement. In addition a further five resignations occurred together with the loss of a further officer at the end of his provisional transfer. It will be appreciated that with an establishment of only 14 professional officers, the loss of seven of these officers over a period of six months placed an increasing burden on those remaining and I wish to place on record my appreciation of the manner in which the remaining staff responded to this situation.

Of the seven vacancies, the post of senior agricultural economist was filled through the promotio of an officer from within the Branch, and, in addition, four new professional officers were appointed. It is expected that the three remaining posts will be filled by the end of 1969 through the appointment of one officer on a lateral transfer and the appointment of two bursary graduates. Early in the year the post of Chief Agricultural Economist was finalized following the acceptance by the previous incumbent of the post, of permanent status with the Agricultural Marketing Authority.

With the increasing volume of work within the Farm Management Research Section a further analytical clerk was appointed during the year and with the increasing responsibilities within this research section, a case was submitted for the upgrading of the post of the senior farm management economist in charge.

Acknowledgements

The Branch continued to receive co-operation and assistance from farmers, officials of branches of this and other Ministries, farming organizations, statutory organizations and the public. Grateful acknowledgement is made for the willing co-operation, understanding and assistance received.

I. J. DOUGLAS,
Chief Agricultural Economist.

Annual Report of the Director of Research and Specialist Services

for the year ended 30th September, 1969

THE year which was one of record agricultural production for the country also saw some outstanding yields on Research Stations, for instance 70.3 bags per acre was achieved under rainfall conditions with the maize hybrid SR.52 at the Salisbury Research Station and over 4,000 lb. per acre of parchment coffee was obtained at the Chipinga Experiment Station, whilst up to 900 lb. per acre of liveweight gain was obtained with yearling steers on pastures stocked with five to six beasts to the acre at Henderson Research Station.

This Department was first established in its present form in April, 1948, under the first Director, the late Mr. J. K. Chorley. We thus celebrate our 21st Anniversary and to mark the occasion a Conference, "Research and the Farmer", was held in Salisbury in September, 1969. This was opened by the Minister of Agriculture and was attended by distinguished scientists from our neighbouring territories, including Drs. S. J. du Plessis, C. E. M. Tidmarsh, J. H. Hofmeyr, F. X. Laubscher and J. van Garderen, Mr. C. A. Murray and Mr. J. Wilson, from the Republic of South Africa, and Eng. J. A. L. Martins Santareno from Moçambique, all of whom either took the chair or presented papers. During this two-day Conference, the proceedings of which will be published, summaries of research achievements in the main disciplines were given, together with a final session on research organization, communication with the farmer and future trends in research. Unfortunately it was poorly attended by farmers, but we were pleased to welcome three of our former Directors, Mr. R. McChlery, Mr. R. R. Staples and Dr. B. S. Ellis.

This Conference is to be followed by open days at each of the Research Stations and Colleges and the first of these at Matopos was opened by Mr. J. A. Clark on the 30th September and was well supported.

To publicize its work, the Department also produced a series of attractive publications, a special bulletin "21 Years of Research", guides to each of the Branches, Stations and Colleges and a catalogue of current research projects.

In June, an irrigation symposium was arranged in Salisbury and was well attended by farmers, members of the ancillary services, research workers and extension workers.

The year was noteworthy for the establishment of much closer relations with the R.N.F.U. in the discussion of research programmes and needs, and culminated in agreement between the Ministry and the R.N.F.U. on the terms under which an Agricultural Research Council will be set up for the co-ordination and reinforcement of research. The Bill to establish the Council has still to be presented to Parliament, but an interim Research Advisory Committee has been established in the meanwhile, under the chairmanship of Mr. R. A. Griffith with Messrs. M. E. Butler, J. O. Cameron, P. A. Donovan, A. B. Kirkman, J. C. Raath, D. K. Worthington, Dr. I. McDonald and Professor A. G. Davis as members.

The Department has pursued its policy of consolidation by concentrating the research effort on the major problems and by bringing teams of specialists together at appropriate centres as has been done so successfully at Henderson for work on animal nutrition and weed control, at Gatooma for cotton research, at Matopos for veld management, and in the Branches for soil productivity, water-relations, plant pest and disease control, and biochemical studies.

Important needs are still to improve efficiency by adjusting the adverse ratio of professional to technical staff and to speed the translation of research findings into practice by paying more attention to research liaison activities.

Despite the appointment of 15 professional officers during the year, the staff situation has worsened with the retirement of two senior officers and the resignation or transfer of a further 20. A number of existing vacancies will be filled at the end of this calendar year with the appointment of newly qualified bursary students, but we shall still be short-staffed in certain disciplines particularly plant breeding, soil science, agronomy and dairy science.

Although the introduction of the long scientific salary scale has done much to improve service

conditions, there is still an urgent need to improve progression within the scale for the more able man.

An encouraging number of research officers have now registered for higher degrees with their University or with the University College of Rhodesia, to whom they will be presenting theses based on the results of departmental research projects. Four members of staff are pursuing full-time post graduate University studies, three at the U.C.R. and one at Aston University in Birmingham. This year has also seen the completion of the first three-year in-service training course in which four technicians have been successful in gaining certificates, Messrs. C. W. Higgins (1st Class), M. J. Joyce (2nd Class), R. G. Bunce and D. G. E. Holland.

The new branch of Agricultural Education was established during the year with the appointment as its Head of Mr. J. W. Walsh, formerly Principal of Chibero College. This completes the disciplinary structure of the Department which now comprises seven main Branches, Animal Production, Botany and Ecology, Chemistry and Soil Science, Plant Protection, Biometrics and Agricultural Education. Unfortunately the position of Chief of Crop Production still remains vacant, a gap which is keenly felt since the work of this Branch, which is spread on 13 Research and Experiment Stations, is in need of more critical examination and closer co-ordination than can be achieved without the full attention of a Head of Branch.

Capital development continued. At Chiredzi development is now nearly complete with the establishment of the horticultural block and extension of irrigation facilities. At Gatooma a comprehensive development plan to provide better facilities for cotton research was drawn up and, with the assistance of the Rhodesia Cotton Growers' Association, a start has been made on its implementation; in particular the installation of the irrigation scheme is nearly complete. At Gwebi Agricultural College, also, much needed water has at last been found and boreholes are being installed by the Ministry of Water Development.

With the assistance of the Grain Producers' Association a variety testing site was established at Gwebi and will provide land for the extension of the plant breeding programme of the Salisbury Research Station. Of particular value for both variety and fertilizer work was the establishment of an Off-Station Trial Unit staffed with two technicians and based on the Salisbury Research Station. This has enabled trials on farmers' land to be conducted more effectively than in the past.

After many years of unsatisfactory accommodation the Dairy Branch were at last moved into new laboratories now just nearing completion on the site of the Salisbury Research Station.

As reported last year a site has been selected for the establishment of a new lowveld experiment station for the study of veld management problems and negotiations are in progress for its acquisition. If these are successful, a start will be made on this development in the coming year.

With the intensification of agriculture and the increased use of pesticides it has become necessary to consider the introduction of new legislation for more effective control over their use and misuse. Draft regulations for the registration of pesticides under the Fertilizer, Farm Feeds and Remedies Act have been discussed with interested organizations and it is proposed that these will be introduced next year. Liaison has also been maintained with the Ministry of Health in the drafting of a Bill to provide for control of hazardous substances in the interest of public health.

The extent to which officers of the Department have been able to maintain contact with organizations in other countries is reflected in the following visits or tours outside Rhodesia.

Mr. J. C. Raath, Director, to South Africa for S.A.R.C.C.U.S.

Mr. P. A. Donovan, Assistant Director, to South Africa for discussions on cotton-fibre and wheat-quality research and training for plant breeeders.

Dr. D. H. Saunder, Assistant Director, to Malawi for the official opening of the Cotton Research Laboratories at Makoka and for meetings of the International Red Locust Control Service.

Dr. T. H. Vorster, Chief of Animal Production, to South Africa for the South African Society of Animal Production Conference and to Moçambique for the S.A.R.C.C.U.S. Standing Committee on Animal Production.

Dr. O. West, Chief of Botany and Ecology, to the U.S.A. for a Conference on the Ecological Aspects of International Development Programmes and to Moçambique for the meeting of the South African Society for the Advancement of Science.

Dr. R. C. Elliott, Officer in Charge, Henderson Research Station, to the U.K. for the International Symposium on the Physiology of Digestion and Metabolism of the Ruminant.

Mr. G. W. Herd, Chief of Plant Protection, to South Africa for the S.A.R.C.C.U.S Standing Committee on Plant Protection and for discussion with the Department of Agricultural Technical Services.

Mr. G. M. Phillips, Chief Dairy Officer, to South Africa for visits to Dairy Co-operatives in Natal.

Mr. A. Rattray, Officer in Charge, Salisbury Research Station, to South Africa for the S.A.R.C.C.U.S. Standing Committee for Plant Protection.

Dr. J. G. Thompson, Principal Soil Scientist, and Mr. W. D. Purves, Soil Scientist, to Moçambique for the S.A.R.C.C.U.S. Standing Committee on Soil Science.

Dr. S. W. Broodryk, Senior Entomologist, to South Africa for discussions on pesticides and aerial spraying, and to Malawi for discussions on cotton pest research with the Agricultural Research Council

Mr. W. B. Cleghorn, Senior Pasture Research Officer, to South Africa for the Grassland Society Conference.

Dr. J. N. Clatworthy, Pasture Research Officer, to South Africa for visits to veld management research stations and farms.

Mr. K. B. Hanssen, Senior Seeds Officer, to New Zealand and Australia for the International Seed Testing Congress.

Mr. H. K. Ward, Officer in Charge, Makoholi Experiment Station, to Australia and New Zealand to visit Research Centres whilst on leave.

Mr. R. M. Mowbray, Senior Poultry Officer, to South Africa for the South African Poultry Association Congress and for discussions on poultry research.

Mr. G. C. Martin, Senior Nematologist, to South Africa for discussions on nematology research with the Department of Agricultural Technical Services.

Mr. A. A. du Toit, Senior Agricultural Chemist, Dr. J. S. Read, Biochemist, and Mr. B. W. Blair, Entomologist, to South Africa for the International Symposium on Chemical Control of the Human Environment.

Dr. F. E. M. Gillham, Former Cotton Plant Breeder, while in the U.S.A. and Britain on leave to discuss cotton breeding and fibre quality assessment.

Mr. D. P. Hanham, Senior Animal Husbandry Officer, to South Africa for purchase of livestock.

Mr. P. V. M. Richards, Weed Research Officer, to the U.K. for the British Weed Control Conference.

Mr. M. J. Herring, Plant Breeder, to Moçambique for discussions on cotton-fibre testing.

Mr. B. K. Simon, Botanist, to the U.K. for visits to Kew and the British Museum.

Mr. M. J. Boyd-Clark, Chinchilla Specialist, to South Africa to visit chinchilla ranches and the Veterinary Research Institute at Onderstepoort.

Mr. J. L. Grant, Animal Husbandry Research Officer, to South Africa for discussions on helminthology research at Onderstepoort.

Mr. P. U. Thiran, Tea Officer, to Malawi to visit the Tea Research Foundation.

Mr. C. B. Payne, Officer in Charge, Rhodes Inyanga Experiment Station, study tour whilst on leave in South Africa.

Mr. L. Green, Former Officer in Charge, Chipinga Experiment Station, to South Africa to study coffee production.

Mr. E. J. Temple-Murray, Plant Inspector, to South Africa for study of Plant Inspection Procedures.

Miss R. K. Grosvenor, Technician, visit to Natal University Herbarium.

At the same time we have welcomed a number of important scientists and other visitors to Rhodesia, including representatives of the University of London, the Scientific Director of I.B.P., senior members of the Department of Agricultural Technical Services and University Faculties of Agriculture, as well as the CSIR and Fisons Fertilizers in South Africa, scientists from Malawi, South West Africa and as far afield as Australia. We have also had visits from groups of farmers in South Africa, including members of the Transvaal Union.

BRANCH OF ANIMAL PRODUCTION

The past year was a favourable one and livestock producers on the whole did well despite widespread outbreaks of Rift Valley Fever in cattle and Blue Tongue in sheep.

The beef industry

During the period under review the number of beef cattle in the European and Tribal Trust areas increased respectively from 1,648,910 and 2,182,870 in 1967 to 1,865,941 and 2,218,246 at the end of 1968. To assist consumers to distinguish more easily between the various grades of beef and mutton, colour marking of carcasses was introduced in March on the request of the Consumer Producer Council.

Smaller producers, particularly those who through force of circumstances had to buy stock at inflated prices, are experiencing difficulties in making a profit from beef. As beef prices may be expected to remain firm producers have no alternative but to reduce production costs. In this connexion there is reason to believe that despite the change in demand from fat to lean beef many producers are making a loss by force feeding animals at too young an age on unnecessarily high levels of concentrates. To reduce costs they will in future have to rely increasingly on the production of high quality roughages at low costs and research in this direction is to be intensified.

Research

At Matopos Research Station the long-term breeding experiment, in which genotoype-environment interactions in beef cattle are being

determined, has progressed to an interesting stage. The steers from the groups that are fed protein supplements during the dry months were this year, for the first time, slaughtered without being finished in feed-lot. Slaughter weights and grades were similar to those of previous years. If the trend towards quicker growth of steers in successive calf crops continues, it seems that, in addition to there being no need to fatten in the feed-lot, the steers will be ready for slaughter at about 28 months as compared with 33 months at the start of the experiment.

Whilst it is evident that beef production can be successfully increased by selecting, within closed herds, bulls with good breeding performance, it is also evident that it will be necessary to guard against the problems arising from inbreeding.

Results from experiments in which calves are being weaned early and late seem to indicate that late-weaned calves which received the required nutrients through their dams grew better than early-weaned calves which were fed separately from their dams. It thus seems that attention will have to be given to the effects of feeding energy-rich supplements to the young growing calf in extensive beef-producing areas.

At Henderson Research Station progress was made in many aspects of animal nutrition such as the effects of diets on body composition of sheep, dairy cow and calf nutrition and the feeding of beef cattle. Simple and economic systems of rearing dairy calves have been perfected for practical application and further studies with fattening steers have shown little economic advantage from adding roughage to the high-energy diet recommended by this station some years ago.

At Grasslands Research Station work indicated that the use of the dry whole maize plant was more efficient in beef production than maize silage.

At Makoholi Experiment Station cow productivity studies were continued. One of these is concerned with effects of summer supplementary feeding on veld compared to conventional practices. Weaner heifers are being grown out to mate at 15 months to test the feasibility of earlier mating on cow life-time performance. One experiment continues on phosphorus nutrition. Heifers fed bone meal as a veld supplement from weaning age show superior nursing abilities in their own successive lactations. Weaning production among supplemented animals continues to be maintained at 20 per cent. above that of their controls. The experiments designed to evaluate the usefulness of performance testing as a selection procedure for bulls, with respect to both high and veld planes of nutrition, was concluded. Together with all other data relevant to performance/progeny testing, this information has been prepared for computer processing by the Biometrics Branch.

The development of the Nkone breed of cattle continues satisfactorily at Tjolotjo Experiment Station. Success at shows, increasing interest in the breed and an active Breeders' Club again resulted in bookings for breeding stock far in excess of supply.

The dairy industry

The year under review was a welcome relief to the dairy farmer although the consequences of the drought and an outbreak of Rift Valley Fever delayed recovery and milk production was not as high as expected, though substantially higher than in the preceding year. Butterfat production was more or less at the same level as in 1967-68.

Interest in whole milk production continued and there was an over-all gain of suppliers to the Dairy Marketing Board and increased production per farm.

The production figures achieved by the Milk Recorded Herds in 1968 provides an indication of what is achieved under our environmental conditions. The herd averages for all herds increased from 7,640 lb. per cow in 1967 to 8,034 lb. in 1968, no less than 20 herds out of 141 under test exceeded an average lactation production of greater than 10,000 lb. per cow and two herds exceeded an average of 20,000 lb. per lactation in the Milk Competition for the best 15 cows in their herds. When sound standards of feeding and management are applied under our environmental conditions it is possible for production per cow to compare favourably with those in the recognized dairying countries.

Research

At Henderson Research Station basic studies of nutrition in the dairy cow and calf weaning were intensified in co-operation with the University College and by the intergration of the costed dairy unit.

At Matopos Research Station the profit per cow in the Dairy Unit dropped from £37.2 in 1967 to £30.2 in 1968 but the value of milk sold rose from £159 to £199 per cow over the same period. In both years the gross margin per cow was £58. The food cost per £100 worth of milk produced increased from £50.4 in 1967 to £62.0 in 1968.

Dairy calves which were abruptly weaned at four weeks of age from whole milk on to Calf Cudlets grew satisfactorily from weaning to the age of 20 weeks.

At Grasslands Research Station four grasses were tested for milk production from early December to early March.

The sheep industry

The numbers of sheep on European farms increased appreciably over the past 12 months and producers have expressed fears that the local market will soon be over supplied with mutton. Through import restrictions it has up until now been possible to maintain lamb and mutton prices at a relatively high level compared with the price of other meats. However, much as this has been welcomed by producers, there seems to be a distinct danger that as a result, lamb production is being encouraged under conditions which are not naturally suited to the rearing of sheep. This matter is being investigated on a regional basis through an analysis of slaughter statistics and under controlled experimental conditions as Grasslands Research Station.

Research

In studies at Matopos Research Station of the effects of the pre- and post-natal planes of nutrition on the growth of the lambs, and the reproductive performance of the ewes, it has been found that 96 per cent. of the ewes which received protein supplements six weeks before lambing reared lambs to a weaning age of five months, compared with 70 per cent. in control groups.

With continued selection the milk production of the ewes has increased markedly in successive generations.

At Grasslands Research Station a fully costed sheep unit has recently been started on 75 acres of planted pasture with a view to studying the costs and associated problems of producing wool and mutton on improved pasture. Three hundred ewes (imported German and Dohne Merinos and station-bred grade German Merinos) form the basic flock and the breeds will be compared for wool and mutton production.

Work on the incidence of nematodes in sheep continues and a study is being made of the effects of nematode burdens on carcass composition.

At Makoholi Experiment Station the comparative sheep production study of German Merino and non-woolled Sabi animals continued to demonstrate the superior growth and carcass qualities of the German Merino on one hand, and the better mothering abilities of the indigenous ewes on the other. Carcasses from wooly lambs were not affected by grass seed penetration.

The pig industry

The pig population on European farms increased from just under 68,000 head in 1967 to nearly 78,000 last year while the total number of African-owned pigs increased to 90,526. As a result Messrs. Colcom Products, Central Co-operative Ltd., was forced to reduce the producer prices of the different grades of pigs.

Research

Investigations on the performance of indigenous pigs continued at Chibero, where experiments to examine the effects of nutritional status on reproduction of the female and digestibility experiments comparing indigenous and exotic breeds are in progress.

The poultry industry

The establishment of the Rhodesia Poultry Producers' Association overshadows all other developments during the year but price fluctuations of poultry products have again given producers cause for concern. The submission of statistics remains unsatisfactory, the quarterly submission for September, 1968, being particularly poor.

A detailed economic appraisal of local egg marketing factors is overdue and should be undertaken soon by the Ministry or the R.N.F.U. Economics section.

Increasing broiler sales show a fluctuation but continually upward trend, yet breeder sales of day old cockerals also continues to rise. This may be due to an increasing awareness amongst African producers of live bird market possibilities.

An outbreak of Newcastle disease in September was very serious. The Veterinary Department, as

usual, applied prompt control measures and no great spread of the disease occurred by the year end.

Research

The second part of the Protein Maize Feeding experiment was completed in December and a paper awaits publication.

An experiment was designed to study the substitution of sugar ("Canex") for maize in laying rations.

Two trials were conducted on the use of cotton seed meal in broiler rations, in the first imported solvent-extracted cotton seed meal (devoid of free gossypol) was used and in the second a locally produced cotton-seed meal.

Results of the first trial await publication.

The chinchilla industry

Recent developments in marketing have indicated that the Chinchilla Industry will be lifted from its depressed state. A pelt producers Co-operative has been established, and the Pelt Marketing Board is continuing to collect and dispatch pelts.

Research

Several projects are being carried out on Chinchilla farms, particularly in connexion with the control of day length for priming.

BRANCH OF BOTANY AND ECOLOGY

The Herbarium and Botanic Garden

Apart from the identification service and general herbarium routine, a large number of accessions were made during the year, bringing the total number of specimens to close on 200,000. Under the Herbarium Exchange Service, duplicates were sent to 43 institutions and Herbaria throughout the world, the main recipients being Kew, Pretoria and Lisbon.

The Grass Botanist returned from working at Kew in January and the grass herbarium has been considerably modified and brought up to date. The Library is at present being entirely rearranged to follow the system used in the Kew Herbarium Library. Work continues on the Rubiaceae and the grass genus *Sacciolepis* for the Flora Zambesiaca although progress has been rather slow due to priority of other projects. The Flora Zambesiaca Fern volume is now in the page-proof stage, and should be published very shortly. An indexed list of all the genera contained in the Herbarium has been prepared and will be sent to smaller Central African herbaria so that conformity can be brought about. Work continues on the list of Flowering Plants and Ferns of Rhodesia and Zambia. Work also continues on a publication of Rhodesian African Plant names and another publication on Trees of Rhodesia.

A number of useful expeditions were made by members of staff during the course of the year, including the Haroni-Lusitu region and the Bikita District of Rhodesia, and the Mwinilunga District of Zambia.

In the Botanic Garden there has been good progress in making the indigenous collection more comprehensive. Many more trees and shrubs have been planted, and to date about 70 per cent. of the woody species of Rhodesia are represented. The labelling of trees and shrubs is advancing satisfactorily; so far about half the trees in the Garden have an accompanying label.

However, due to shortage of funds little advance has been made in increasing the developed areas, and grass planting has been far too slow.

Ecology

Except for slow growth of grass at the beginning of the rainy season in parts of the watershed the season was favourable for grass growth throughout the country.

Damage to trees caused by the severe frosts, which occurred in June, 1968, is still very noticeable in many areas indicating the severe damage caused.

Controversy over the advantages and disadvantages of high intensity short duration grazing continued during the year. Farmer interests in veld management problems has been manifest in the number of requests received from I.C.A.'s for talks on veld management and the good attendance at such talks.

Following the acceptance by Government of the offer by Charter Estates to provide facilities for comparing the high intensity short duration system of grazing management with the system used at Charter, staff of the Branch from Grasslands Research Station completed a botanical analysis of fixed sample areas within each paddock of the trials on Charter Estates.

The principles involved in the use of multi-paddocks for the management of veld grazing are being studied in research projects at Matopos Research Station and Nyamandhlovu Experiment Station.

At Grasslands and Matopos Research Station emphasis is being placed on the introduction and testing of pasture legumes.

Numerous surveys have been undertaken to assess the condition and trend of vegetation and to advise on management requirements.

Surveys for the Department of National Parks and Wild Life Management were made in the Gona-re-Zhou Game Reserve, Kyle National Park, Rhodes Inyanga National Park, Wankie National Park, Victoria Falls National Park.

The Branch continued to be responsible for teaching Veld Management as a subject at Gwebi College of Agriculture, and lectures on various aspects of veld management were given at the University College of Rhodesia and at many meetings of I.C.A. and Farmers' Associations.

Research

At Matopos Research Station the work on veld management has been intensified and the following is a selection of the more interesting results obtained during the year.

The first steers from the grazing trial on cleared veld at Matopos Research Station, in which two multi-paddock (12 paddocks to one herd) systems stocked at a rate of one steer to 8½ acres are being compared with a three-herd-to-four-paddock system stocked at a rate of one steer to 13 acres, were slaughtered in April, 1969. In one, the principle of quick-graze-long-rest plan is applied, and in the other management is according to a complete-graze-long-rest plan. The liveweight gains per steer from April, 1968, to April, 1969, and the gross return per carcass were as follows: for the "complete-graze" system, 193 lb. and £44.90; for the "quick-graze" system, 311 lb. and £50.25; and for the three-herds-to-four-paddocks system, 341 lb. and £53.40. Carcass measurements showed the depth of fat at the 10th rib and the area of eye muscle to be greatest in the carcasses from the latter system, but the differences were not significant. The commercial carcass grades were the same with all three systems of management.

In a similar trial at Nyamandhlovu Experiment Station, a 16-paddocks-to-one-herd quick-graze long-rest system is being compared with a four-paddocks-to-one-herd deferred rotational system on ring-barked veld. Breeding stock are used, and the stocking rates are one cow and calf unit to 14½ and 19 acres in the 16 paddock and four paddock systems respectively. In-calf heifers entered the trial in July, 1968, and their calves were weaned in July, 1969. The gain per day of the calves and the 205 day adjusted weaning weight were as follows: for the 16-paddock system 1.64 lb./day and 414 lb., and for the four-paddock system 1.69 lb./day and 437 lb. The reconception rates, determined by palpation, were 92 per cent. and 100 per cent.

In a ring-barking trial on *Burkea africana*, only 13 per cent. of the trees have died two years after ring-barking took place. The best percentage kill has been 43 in the plots which were ring-barked in October and which had regrowth removed twice a year.

There is a continuing need to evaluate new methods of botanical analysis under local conditions. Of procedures tested during the year, the "line intercept" proved to be the best technique for the determination of basal cover, and the "frequency quadrat" was the only method which gave acceptable estimates of the importance of the species present.

At Makoholi Experiment Station an eight-year study of the effects of grazing practices on the control of woody species was reviewed. The outstanding feature of the experiment was the complete failure of goats to reduce muNondo (*Julbernardia globiflora*) and muKarati (*Burkea africana*). Three point six tons/acre of regrowth were removed following grazing by goats, the comparable figure for cattle being 0.4 tons. Systems of deferred grazing with or without veld burning were no more productive (in terms of grass yield and grazing days), or more effective in the control of regrowth than those treatments providing shorter individual periods of growing season rests. Tordon 101 showed promise as an economic arboricide. Two-thirds of a woodland stand treated in January at a cost of 10s./acre was dead by the end of September.

Work continued at Tjolotjo Experiment Station on the use of goats to control regenerating brush under Teak forest.

BRANCH OF CROP PRODUCTION

The season was an exceptionaly good one for crop production despite cold germinating conditions in November and a three-week dry period

in February. Rainfall distribution was particularly favourable for crop growth throughout most of the season with record late rains falling in April which boosted yield but also increased insect and disease damage.

Interest in the Henderson Research Station small-scale farming units by African farmers continued unabated and, with the help of the Department of Conservation and Extension, this station catered for several thousand visitors. The profitability of these farm units has now been clearly established and they serve mainly a demonstration function.

Fruit production was well maintained and expansion has continued. It was necessary to warn growers that over-production of dessert peaches was likely in the immediate future and that at present, no further plantings should be made. Canning (Yellow Cling) peach crops increased but supplies were insufficient in the Umtali area for the local factory. Heavy rains and high humidity upset harvesting and marketing of both dessert and cling peaches. Apple crops were fairly good but sufficient only for a five-month supply of the fresh markets, although many young trees have yet to reach bearing age. Citrus trees recovered from frosts but crops were smaller than usual. Nursery trees were still in very short supply. Plantings of grape vines both for fresh fruit and wine production have increased considerably. Crops were hit by rain and a lesser quantity could be marketed. Whilst sub-tropical fruit growing continued at a moderate level, increased planting of nut trees occurred.

Fresh vegetables were in good supply until heavy rains set in, then plentiful again through winter and early summer. With no frost damage, tomatoes in heavy supply fetched low prices. Onions were grown and marketed over a long season with prices more stable. About 1,000 acres of peas were grown for processing.

The Bulawayo Municipal Produce Market was closed down.

Testing of Rhizobium strains for factory use was continued at Grasslands Research Station. New isolates were made and the collection now consists of 700 strains for 350 legumes species.

The factory produced 28,981 units of inoculant during the year. Of these, 16,093 were sold, 293 issued free and the remainder stored or destroyed (depending on expiry dates). Soya beans, groundnut, pea and bean inoculants were produced on a peat base while lucerne and less popular strains such as those for clovers, lupins, sunnhemp, velvet beans and cowpeas were produced on an agar base.

Although most of the inoculants now sold are produced in peat more work is needed to streamline the production process, to ensure high bacterial populations and to eliminate contamination risks.

At Chiredzi Research Station trials on rice were conducted under overhead irrigation as part of the first programme of experiments done on this crop in the lowveld. Both Blue Bonnet and Blue Belle varieties were studied at different spacings, fertility levels, and irrigation regimes. In general the short-season Blue Belle proved higher yielding and optimum nitrogen levels differed for the two varieties. Spacing trials indicated that close drill rows were best but no yield differences were obtained from seed rates of 70 to 130 lb. per acre. Irrigation studies showed a tendency for improved yields with frequent light applications of water, but yields were only slightly reduced when greater quantities of water were applied at longer intervals. Yield levels of Blue Belle with optimum treatment were about 5,400 lb. unhulled rice per acre, and Blue Bonnet yields were 600 to 800 lb. per acre lower.

Field trials on cotton showed only slight yield response to applications of nitrogen, and indicated that time of application of nitrogen was not critical between planting and 10 weeks of age. Experiments to investigate skip-row spacing effects under conditions of normal and rank growth produced no significant yield differences. Work on physiological loss of bolls in cotton was continued in co-operation with the Tobacco Research Board.

Maize investigations were confined to variety and spacing trials, and satisfactory yields were obtained from many of the short-maturing varieties; yields from Rhodesian hybrids 52 and 14 were low. Early varieties proved higher yielding in 2 ft. rows, but late types were better when planted 3 ft. apart.

Field trials were continued on safflower, but the crop continued to yield poorly; information was obtained on the irrigation and nitrogen requirements of the crop.

At Sabi Valley Experiment Station, cotton yields were lower than usual due to the effects of the late rains. Nitrogen trials confirmed previous results, and showed that levels of nitrogen in

excess of 80 lb./acre caused marked yield reductions. A comprehensive study to investigate time of nitrogen application showed that timing was not important from planting to 10 weeks of age. Topping of plants improved Albar yields, but had no effect on Deltapine. An irrigation trial showed the benefits of frequent light irrigations, and indicated that Deltapine was more tolerant of dry conditions than Albar.

At Chisumbanje Experiment Station, cotton yields were lower than recorded in the past, due largely to wet weather during the harvest period. Trials to compare various levels and times of application of nitrogen established optimums for these two factors. Maize yields were disappointing, but useful information was collected on the performance of early and late-maturing varieties when planted at different row spacings.

Cotton agronomy work continued at Gatooma Research Station and included studies of water planting. There was no effect on yield due to time of planting or quantity of water used at planting but there was a significant interaction between time of planting and amounts of water because at the earlier time of planting stands were reduced and flowering delayed by drought stress. It was apparent that at least 11,000 gallons/acre are required on a heavy soil for the establishment and survival of a crop for two weeks.

In a trial conducted at Trelawney, on sandveld, there was a linear response in yield up to 170 lb./acre of Nitrogen applied in four top-dressings.

At Grasslands Research Station, Rhosa soya beans, and some other varieties, produced yields of 15 to 16 bags per acre when seed was inoculated but only half these yields were achieved with un-inoculated seed. Both lime and early (November) plantings, compared with late (December) plantings, resulted in a small increase in yield of soya beans.

In the winter wheat programme highest yields, 24½ bags/acre, were obtained from the variety Devuli.

Due to the February dry spell, when late maturing maize varieties were in a critical stage of growth, maize yields on the Station were very variable. Single hybrid S.R. 52, for instance, fared very badly in a maize variety trial and late maturing varieties generally produced less than 20 bags/acre while the early varieties yielded in excess of 30 bags/acre. By way of contrast, in a trial which benefitted from half an inch of rain during the dry spell and in which four tons per acre of compost is applied annually before ploughing to a depth of at least nine inches, S.R. 52 yielded up to 45 bags per acre.

At Makoholi Experiment Station early maize varieties fared a little better than late maturing types, and yields showed an inverse trend from 9 to 4 bags/acre as population increased from 11,000 to 28,000 plants per acre. Sorghum was no better than maize but some groundnuts varieties yielded up to 10 bags of kernels per acre.

At Matopos Research Station, variety trials with grain and forage sorghums, maize, groundnuts, soyabeans and wheat were conducted. Under supplementary irrigation the late-maturing groundnut variety, Sigaro Pink, yielded 24.1 bags of kernels per acre and the average yield of all varieties was 21.1 bags per acre. In the soyabean trial the average yield was 15.3 bags per acre; the highest yield, 17.6 bags per acre, was obtained with the variety Biensville.

In a wheat variety trial grown under irrigation in winter the highest yielding variety, Tokwe, gave 36.7 bags per acre; the average yield of all entries was 27.9 bags per acre.

In a test of the efficacy of fungicides applied to the sorghum crop, it was found that downy mildew *(Sclerospora sorghi)* and leaf blight *(Helminthosporium turcicum)* were not controlled by M45 (Dithane) and Mancozeb.

Where irrigation water was applied to ploughed land in the mid dry season, yields of a dryland crop of grain sorghum grown in the next growing season were increased in proportion to the amount of irrigation water applied Yields with the 0 and 8 inch levels of application were 9.1 and 16.0 bags per acre respectively.

At Henderson Research Station the weed research programme concentrated mainly on screening a large number of herbicides for their capacity to kill four common weeds (Shamva and Rapoko grass, Wild Gooseberry and Starbur) and their toxic effects on the most important crops of maize, cotton, soyabean and groundnuts. Work on herbicides was also done at Chiredzi Research Station where a herbicide screening trial was conducted on cotton and maize with valuable results, and many of the chemicals tested gave complete weed control without damaging the crops.

In the Crop Ecology programme at Salisbury and in collaboration with the soil physicist a model is being developed to describe water use by maize under natural rainfall conditions. This model will be used to analyse long term rainfall data for length of growing season and the incidence and duration of drought periods. Such an analysis will allow a more precise assessment of the cropping potential and the need for irrigation over the country.

Experiments to describe how the sensitivity of wheat and maize to water changes over the life cycle of the plant, were conducted. The results of these experiments should lead to considerable savings in irrigation water during the relatively insensitive vegetative phases of crop growth.

Plant breeding

Despite the substantial increase in the Department's establishment for Plant Breeders, more than half of the eleven posts were vacant for most of the year. This seriously limited the scope of plant breeding programmes. Some advance was made in the establishment of testing sites for various plant breeding programmes, notably the Gwebi Variety Testing Centre and at Sabi Valley Experiment Station. The creation of an off-Station Trials Unit to conduct agronomic trials on farms in different parts of the country also facilitated the work of breeders.

Maize

No new varieties were released for the 1968-69 season although several experimental single, double and three-way hybrids continue to outyield the commercially available hybrids. Release of these experimental hybrids is dependent upon final evaluation in District Variety Trials conducted at 17 sites throughout the country. Several hybrids developed at Salisbury Research Station specifically for lowveld conditions, have performed well in trials there. One of these, a three-way hybrid to be designated R200, has been released primarily for lowveld production, but also as a replacement for NRP x K64r in the marginal rainfall areas. Seed of R200 will be available commercially for the 1970-71 season.

The development of yellow hybrids is progressing satisfactorily with 15 experimental yellow single and three-way hybrids outyielding S.R. 52 significantly this season.

The first generation of crossing the collection of exotic races and varieties of maize from the Central and South American "Centres of Origin" to form composites, was performed in the winter nursery at Sabi Valley Experiment Station. Four more generations of such crossing will be necessary to homogenise the six composites.

Work continued on backcrossing of the high quality protein gene (opaque—2) the single dominant resistance gene, and the male sterility restoring gene into the inbred parents of S.R. 52 and other experimental inbred lines.

Wheat

The breeding programme underwent further expansion, with 80 new crosses being made during the winter of 1969 to incorporate sources of stem rust resistance obtained from the International Rust Nursery and high baking quality, into locally adapted dwarf varieties. A programme to develop varieties adapted to lowveld conditions has been initiated, and the first varieties from this programme will be tested in trials in 1970.

Advanced variety trials on all the main research stations were initiated in 1969 to obtain information on site interactions of varieties.

Although the 1969 winter was mild, yields of up to 45 bags per acre were obtained from variety Tokwe. No responses to seeding rates above 30 lb. per acre were obtained, and no difference between 5 to 10 inch row spacings were observed, demonstrating the compensating ability of tillering in our varieties.

Barley

80 new introductions from 13 countries were screened during the year. Important new sources of dwarfness, malting quality and early maturity were obtained, and these traits will be incorporated into locally adapted varieties.

Two newly released varieties, B14 and B44 were bulked in preparation for commercial planting in 1970. Record yields of 51.43 bags (150 lb.) per acre were obtained from the new dwarf variety SB41B2.

Oats

The 39 new introductions screened during 1968 unfortunately contained the bacterial disease *Pseudomonas coronafaciens*, and accordingly had to be destroyed. Further introductions will be made in 1970 and will be grown in isolation.

A variety x cutting-time trial was carried out and samples were measured for dry matter production and crude protein content.

Seed of the new variety Florida will be bulked. This has proved a good dual purpose variety having grain suitable for commercial usage.

Potatoes

Virus tested foundation seed of eight varieties was bulked up at Pungwe Field, Inyanga. Up-to-date, Kurrel, Pimpernel, Van der Plank, Cedara and Atleet were made available for release to members of the Seed Potato Association.

A large proportion of the foundation seed tubers were infected with Rhizoctonia (Black Scurf) and were treated with a mercuric dressing, the success of which will be determined this coming season.

Soyabeans

Expansion of the soyabean breeding programme continued according to plan. Thirty-two single and multiple crosses were attempted in summer and multiplied in the greenhouse during winter 1969. Segregating material from 61 crosses was grown at Chiredzi Research Station during winter 1968 and 82 crosses grown in greenhouses comprised the summer generation on the Station. Some 700 single plant progenies and 53 new introductions were examined, 167 of which were selected for preliminary yield evaluation in 1969-70.

In preliminary yield trials of 36 varieties conducted at Salisbury and Gwebi, a number of entries were promising compared with variety Rhosa. The highest yielding entry was a selection from variety Hood giving an average of 15 bags per acre over both sites.

Groundnuts

Work was concentrated on the examination of over 500 selections made from variable material last season and about 60 lines were chosen for critical yield testing and over 550 selections were made from segregating material.

A comprehensive system of variety testing on a national scale was initiated and trials of early maturing and late maturing varieties were grown separately. The results of seven early maturing variety trials showed that there were no varieties superior to Valencia R1 and in seven late maturing variety trials Makulu Red was the highest yielder closely followed by Sigaro Pink.

A promising range of new varieties mainly of South American origin entered preliminary yield trials which were carried out at Salisbury and on Sandveld in the Trelawney district. Indications of better yields, disease resistance and improved seed quality were obtained, and some of the varieties will enter advanced trials on a national scale in 1969-70.

Examination of varieties suitable for marginal rainfall areas continued at Makoholi Experiment Station.

Cotton

Trials on varieties for the middleveld were conducted at Angwa North, Henderson Research Station, Shamva, Umshandige and Nyanyadzi Irrigation Scheme and results confirm the previous year's findings that Albar S63/25 is better both in yield and lint quality than S63/33 and S63/15. Spinning tests have also shown S63/25 to be superior. This line has, therefore, been released as Breeder seed for 1969.

Work on the Deltapine variety for the lowveld continued at Sabi Valley Experiment Station and at Guy Hulett Experiment Station, Triangle. This material has now reached the Replicated Progeny Trial stage in testing and S67/469 shows 200 lb. of seed cotton and a one per cent. ginning out-turn improvement, with greater fibre strength than Commercial Deltapine.

In a trial at Gutsa the best of the extra long staple varieties was Del Cerro 169 which gave a yield of 1,508 lb. of seed/cotton/acre and a ginning out-turn of 32.5 per cent. A 1½ acre plot of Del Cerre was bulked there to provide seed for a 20 acre pilot scheme in 1969-70.

Quick maturing varieties for marginal areas were tested at Mrewa with Deltapine, Rex Glandless and Coker 201 showing promise. Paymaster 111 was bulked to provide lint for spinning tests and Rex Glandless was bulked to provide seed for oil expressing tests and lint for spinning tests.

Sorghum

A grain sorghum breeding programme was started at Matopos Research Station during the year but will eventually be based at Gatooma Research Station. Initial screening and crossing procedures have been successful.

Planted pastures

At Grasslands Research Station results obtained during the season provide further evidence of the ability of legumes to produce increased yields of herbage for both veld and planted pastures, suitable for a relatively low level of intensification, but of their inability to compete with heavy dressings of fertilizer nitrogen in attaining maximum production per acre.

Stylo (*Stylosanthes guyanansis*) was successfully seeded into veld after a shallow discing. This legume, which is readily eaten by cattle at all stages of growth, increased the herbage yields of veld approximately 50 per cent. and nearly trebled crude protein yields.

Lotononis bainesii persisted well and resulted in increases of dry matter yield equivalent to an application of 90 lb. N/acre to pure grass stands, and crude protein yield equivalent to the application of 13 lb. N/acre. A strain of this legume, resistant to the root-knot nematode, has been selected and is being bulked up for general release.

Steer gains on planted pastures were generally disappointing: an exception was a group of steers grazing Ermelo Love grass (fertilized with 100 lb. N/acre) which gained over 200 lb./head and 700 lb./acre during the first half of the rains. In a comparison of five grasses receiving 120 lb. N/acre, greatest gains per acre were obtained from Paraguay Paspalum (440 lb.).

At Henderson Research Station pasture research work again concentrated on selection of suitable grasses for, and cultural and managerial requirements of heavily fertilized, intensively grazed summer pastures. The birth of goitrous lambs and occasionally unaccountably poor growth by cattle has exposed problems in need of study.

Horticulture

Testing of varieties of fruit and vegetable crops, including grapes, for local suitability formed the main activity at Henderson Research Station.

At Chiredzi Research Station the horticultural programme was concerned essentially with the establishment of variety screening trials of various sub-tropical fruit and nut crops. Trials on avocados, mangoes and macadamia nuts were planted from local and imported nursery stock. Observational plantings were also made of such short-term fruits as granadillas, papaws and grapes. A comprehensive banana trial was established to evaluate different spacings, nitrogen, and potash levels. Results of vegetable research confirmed the difficulties of production during the hot lowveld summer, and in future research of vegetable production will be confined to the winter period.

At Chipinga Experiment Station the programme of coffee research has been greatly improved through higher standards of management, the commissioning of an irrigation scheme and more mulching. Trials are in progress to study the effects of shade, nitrogen and phosphorous and lime on coffee production. There are also variety trials and a recently established management trial in which levels of nitrogen, shade, shelter and pruning are investigated.

A number of trials on Tea Estates, conducted in co-operation with the Tea Research Foundation of Malawi, are supervised from Chipinga Experiment Station, these largely concern mineral nutrition problems, particularly of Nitrogen, Phosphorous and Potassium, Zinc and other minor elements.

Old seed bearers growing near Melsetter have been grafted over to the most promising clones available from Malawi and at Chipinga a jat collection and a seed bearer garden have been started. Other promising material has been introduced from Malawi and rooted.

At Rhodes Inyanga Experiment Station two new Apple Root-stock/Variety trials were planted during the year and the propagation of nematode-free stocks for future work of this kind was started.

In the Apple establishment trials extension growth in the second year was $\pm$ 25 per cent. higher in the DD-fumigated plots.

In the Apple management trial stem-end crack of Ohinemuri and bitter pit of Starking were more severe under mulch than under traditional or permanent sod treatments.

No-cultivation continued to give higher yields than traditional treatments in the Peach Management trial.

Extensive mole-rat trappings begun in August 1968 has effectively reduced populations in all trials.

BRANCH OF BIOMETRICS

The Biometrics Branch continued throughout the year to provide advice in the planning of research work and in the evaluation of results from a very wide range of trials with annual and perennial crops and with livestock.

The previous arrangement with the Air Rhodesia Corporation for the use of their I.C.L. 1500 Computer was continued and permitted the full and detailed analysis of many projects. One of the important basic virtues of a computer is the ease with which it can handle bulky data and the Branch has been able to demonstrate the assistance which can be given to the better interpretation of research results by the examination of the inter-relationships, which exist between the multiple measurements, which are a feature of most experiments. Greater appreciation of this approach by research workers, who have in the past been restricted to the analysis of only a portion of their collected data by the limitation of bench calculating equipment, has caused a considerable expansion in the work performed by the Branch.

A large number of variety and agronomic trials with annual crops such as maize, cotton, soyabeans and groundnuts have been analysed. Much time has been spent on the evaluation of a widespread range of herbicide trials, in which the effects of the various chemicals both on the crop and on the weed population have been studied. Perennial crop work with tea, coffee and deciduous fruit has required considerable time both in the planning of new experiments and in the study of the results now becoming available from existing trials. An interesting new development has been the introduction of foliar analysis and it is hoped to relate such data to crop performance.

The analysis of massive quantities of data from various animal projects have occupied a large amount of computer time. At the request of Conex the scheme to evaluate the performance of beef calves has been further expanded and modified, and the analysis of weaning weights from a large number of commercial herds has become a major routine process. A long-term stocking rate/feeding trial on beef cattle, operated by Conex in Matabeleland has been evaluated, while other studies with sheep and indigenous pigs are continuing.

Some work for other organizations has been carried out. Mention may be made of sugar cane trials which have been analysed for the Rhodesia Sugar Association Experiment Station, and of the survey to examine the effectiveness of herbicides in cotton designed for the Rhodesia Cotton Growers' Association. Work has also been performed for the University College, the Forestry Commission and others.

Time spent on the computer has gradually increased, particularly when the results from the 1968-69 field trials were evaluated. It was possible this year to achieve a far more rapid throughput of the analyses, thus permitting research workers to plan their work better in the new season. More than 30 hours per month have been spent with the computer and it is likely that this level of usage will be maintained throughout the year, with further expansion very probable, since the Branch will be more completely staffed than previously. The appointment of D. Chalton and the impending return of D. Salmon, now completing an M.Sc. course overseas, and the filling of the one remaining vacancy, could lead to availability of computer time becoming a serious restriction on the amount of work undertaken by the Branch. It is apparent that within the Department, and in fact in the entire Ministry of Agriculture, there are many projects, both large and small, which would benefit enormously by the application of a computer. Simpler and more efficient data handling and the application of biometrical procedures on a wider basis could reap great rewards. More detailed examination of crop statistics, dairy records, etc., are examples.

There is an increasing urgency to establish modern computer facilities for scientific and research work. The more modern advances in computer technology would suggest a large central installation with access provided for smaller satellite units, but while this scheme should be the over-all aim, the interim provision of better computer facilities for the Biometrics Branch needs immediate consideration.

BRANCH OF CHEMISTRY AND SOIL SCIENCE

The demands made on the general analytical service provided by the Branch continue to grow, both in numbers of samples and the variety and amount of work involved. Over 3,000 samples, other than soils, have been analysed and in addition a considerable number have been dealt with by seconded analysts on the Grasslands, Henderson and Matopos Research Stations. In collabora-

tion with the Gatooma Research Station the applicability of petiole analysis to the prediction of the nitrogen requirements of cotton during the growing season is being investigated, and a large number of samples from experimental sites have been analysed. A survey of the gossypoll content of Rhodesian cottonseed and cottonseed cake has been completed and has provided a useful indication of the nature and extent of the problem in this country.

The annual survey of the incidence of aflatoxin in the national groundnut crop has shown a reduction in contamination, compared with the 1967-68 season, which is attributed to the better growing conditions experienced this year. A periodic sampling of other stored products has been initiated, with the assistance of the Grain Marketing Board, and collaboration in the projects of the Aflatoxin Research Team has continued.

Considerable progress has been made in biochemical work on the sex-attractant of the maize stalk-borer. The pheromone has been isolated from crude extracts of the female gland, using gas chromatography; it has been chemically characterized, and a synthetic pheromone has been prepared and tested for biological activity in the laboratory. Gas chromatography is also being used for the determination of pesticides residues to assist the Plant Protection Branch in a study of the persistence of chlorinated hydrocarbons in plants and soils.

Reorganization of the spectrometric laboratory, and the replacement wherever possible of spectrographic by spectrophotometric methods, has improved the capacity of the laboratory to handle the ever-increasing volume of foliar analyses required for plant-nutrition surveys and diagnostic purposes. The former surveys are at present mainly concerned with coffee and deciduous fruit, but work has recently been started on tea.

In collaboration with Triangle Limited studies of the salt-balance of extensive areas under irrigated crops have continued. The results of three years' records are now being processed and are revealing valuable data of general applicability in the south-eastern lowveld.

In the soil-testing section 1,426 advisory reports were issued. This involved analysis of 4,131 samples, compared with 3,966 in the previous year, which represents a normal annual increment of 4 per cent. There was no marked change in the pattern, except for an increase of 79 per cent. in the number of samples submitted by individual African farmers, which is encouraging, and a doubling of the number of recommendations given for crops grown outside Rhodesia. Reports were also made on the analysis of 1,663 samples submitted for compilation of scientific data or correlation with the results of critical field trials.

In support of the soil advisory service, fertilizer experiments were conducted on maize, groundnuts, potatoes, and soyabeans in collaboration with the newly formed off-station trials unit of the Department, and two long-term trials on coffee were laid down on farms in the Vumba. In the laboratory a method of coating seed-maize with zinc oxide has been developed for prevention of zinc-deficiency symptoms in the early stages of growth.

Research in the soil physics section during the year was largely concerned with water requirements and plant growth studies. The former consisted of an investigation of the water requirements of maize at the end of the rainfall season, in which the relationships between soil-water, evapotranspiration, and leaf-senescence were studied in maize plants in different ages. Also during the summer, groundnuts were planted in different ways (on the flat, in furrows, and on ridges) and their development pattern recorded in order to determine the contribution of various parts of the plant to final yield.

A detailed study of the growth and development of wheat was carried out during the winter in collaboration with the Chiredzi Research Station and the Crop Ecologist. This was the first step in an attempt to determine the reasons for the vastly differing yield potentials of the lowveld and highveld. In conjunction with this study selected measurements were made on a number of varieties in the advanced variety trials at the two sites and also at the Matopos Research Station.

A detailed technique for estimating the start of the rainfall season, season-length, and drought within the season was designed in collaboration with the Crop Ecologist to make it possible to estimate the probability of drought and season-length throughout the country. The project is a very large one and is dependent in its progress on the availability of Biometrics staff and computer time.

The late rains experienced in April highlighted the need for rain shelters for studies of crop water requirements, and a further concerted effort was made to redesign shelters that could be built with available funds.

In the Soil Productivity Research Laboratory at Marandellas the effects of tillage on soil conditions and root development have been studied. Changes of hardness and porosity in, and immediately below, the plough-layer were measured, since root-washings showed a considerable reduction in roots in unbroken soil. Simple, cheap laboratory and field-scale penetrometers were developed, and values of soil hardness limiting to root development were estimated from greenhouse trials.

The unit has continued its long-term study of changes in sandveld soils under continuous cropping. Soil analysis after the average rainfall season of 1968-69 showed the resumption of a progressive decline in magnesium, nitrogen, and potassium, although the last-mentioned is applied in excess of recommended maintenance dressings. The factors considered in these studies include liming, depth of cultivation, return of stover, and applications of manure and nitrogenous fertilizer. Only the last-mentioned have had much effect on productivity, and in other experiments on the restoration of acid, infertile sands, nitrogen and phosphorus have been shown to be more important than lime.

In view of the increasing importance of sulphur, as a result of the modern trend to use more concentrated fertilizer materials with a lower sulphur content, a programme of field trials has been started to assess the amount of sulphur that must be applied in fertilizers in order to prevent sulphur deficiency in maize. The results of analysis of plants and soils in the first season of field trials support the estimate previously made that fertilizers should supply about 20 lb. S per acre annually.

Soil surveys to assess and map the irrigable soil potential of 24 proposed schemes have been undertaken, of which five were between 500 and 5,000 acres in extent and a further three each involved several hundred square miles in the south-eastern lowveld and the midlands.

Research has continued into the processes that may be responsible for the apparent loss of a large part of the clay fraction of soils derived from granite. One project, a detailed study of the mechanism by which clay has become mobile and been transported down-slops at a particular site in the Mondoro Tribal Trust Land, has been completed and presented for publication. A comparison has also been made of the degree of weathering and leaching of soils derived from specific parent materials of landscapes of different ages and, as expected, the characteristics of the younger soils reflect less weathering and leaching and consequently higher inherent fertility.

In the laboratory, special attention is being paid to mineralogical studies, and work is progressing on techniques for preparing thin sections for mineralogical examination of soils and for the pre-treatment of clay fractions for X-ray diffraction determination of clay minerals.

BRANCH OF PLANT PROTECTION

Entomology

Salisbury Laboratory

A satisfactory bioassay technique of confining *Drosophila melanogaster* on treated soil was evolved and detection of 4 ppm DDT and 0.02 ppm Dieldrin in soil was achieved.

Trials showed that compared with sand, red soil considerably reduced the efficacy of chlorinated hydrocarbon insecticides, particularly at economic dosage levels.

Copidosoma uraguayensis has been distributed widely over Mashonaland and Matabeleland. In northern Mashonaland, where some potato crops have been under weekly observations, up to 90 per cent. control of potato tuber moth has been achieved by this, and indigenous parasites. Two consignments of *Apantales subandeanus* were received from Pretoria and successfully bulked up for distribution. These parasites are more tolerant of low temperatures than *Copidosoma* and should become established in Manicaland where they have now been released.

In collaboration with the biochemist the chemical structure of the sex attractant pheromone of the maize stalk-borer, *Busseola fusca*, has been partly elucidated, and work on the complete structural analysis, synthesis of possible active compounds and their incorporation into traps is proceeding.

Five species of cutworm *Agrotis* spp. were reared on artificial and natural media, under con-

trolled conditions to elucidate their life history with a view to rationalizing current crop control measures. Studies on the over-wintering, ecology, taxonomy and the effect of larval crowding were started.

The primary parasites of *Trioza erytreae* were found to exert little control over populations of this pest since their influence was to a large extent nullified by hyper-parasites.

First results of a survey of *Quadraspidiotus perniciosus* in the Eastern Districts indicate that the pest is widespread, but reaches serious proportions on relatively few farms.

Cotton Pest Research Team

Laboratory screening of promising pesticides was continued. Of 60 compounds screened against red bollworm, about five chemicals appeared promising. These and other promising chemicals were included in field trials at Gatooma and Chiredzi. On the basis of these trials an additional chemical for bollworm control was recommended for areas where red spider tends to be a chronic pesticide-induced problem. A total of 63 possible acaricides were screened and eight of the best ones were included in two field trials at Chiredzi Research Station. Based on this work, new acaricides can be recommended for ground application whenever appropriate.

Research on methods of application was concentrated on evaluating the performance of a venturi-type mistblower in comparison with the conventional tractor-drawn tailboom rig. The mistblower gave good control, comparable to the tailboom system in a season which was noted for its extended heavy *Heliothis* attack and low incidence of red bollworm. In addition, an aerial spray trial was conducted in the Lowveld where it was shown that an application rate of four pints per acre gave good control of *Heliothis*.

Mite research was emphasized and another country-wide survey was conducted with the assistance of Dr. M. K. P. Meyer of the Research Institute for Plant Protection, Pretoria. This survey yielded a list of Rhodesian red spider hosts, both cultivated and wild.

The pink bollworm survey was conducted from January to July and a definite focus of pink bollworm activity was established during June and July at the Middle Sabi Development Company. Biological work is being initiated and a small culture of the moth has been started.

A total of 35 promising chemicals were screened against *Plusia* eggs and about two of these appeared promising. Virus control in laboratory tests remained excellent. About 10 grams of polyhedral material were accumulated for limited field application.

A trial to assess the effectiveness of carbaryl plus molasses in place of DDT against *Heliothis* in the recommended spray programme produced interesting preliminary results. In a season of high *Heliothis* incidence both the 20 per cent. and 10 per cent. molasses/carbaryl treatments gave good control of this bollworm.

Plant pathology

Relatively cool weather and heavy rainfall early in the season was responsible for widespread damping-off and leaf spotting diseases in young cotton crops.

The incidence of maize ear rots was high owing to late rains. Purple stain of soyabeans *(Cercospora kikuchii)* was common, and high levels of seed staining occurred in some crops, particularly of the variety Rhosa.

Despite early rainfall late blight was virtually absent from the main summer potato crop. This can probably be attributed to the destruction of sources of inoculum by the severe frosts of the preceding winter. Late blight, however, caused severe losses in irrigated crops planted in February and March. A fungicide evaluation trial planted in late November was not infected, and no significant difference between treatments occurred.

An investigation of the ecology of *Verticillium dahliae* in Rhodesia cotton soils was commenced. A method of assaying numbers of *Verticillium sclerotia* in field soils is being used to determine fluctuations in populations of the pathogen under different environmental conditions.

Forty-three selections of *Coffee arabica* were received from Portugal and work has commenced on the screening of this material for resistance to bark diseases, *Fusarium stilboides*.

In fungicide evaluation trials on grapevines, copper and copper plus organic formulations were more effective than organic fungicides in maintaining foliage on the vines.

Weekly applications of mancozeb failed to control leaf blight of sorghum in trials on the highly susceptible variety *Framida*.

Nematology

A geographical survey of the distribution of *Radopholus similis* on bananas, resulted in the finding of a number of infested sites, mainly in the Lowveld. Preliminary trials have show that sugarcane, maize, rice, wheat, tobacco, soyabeans and potato can all act as hosts to the parasite and that groundnuts can be seriously affected. Normal storage of harvested groundnut fruits for 50 days results in the death of all the contained nematodes. Trials are in progress to see whether *R. similis* remains active in the winter and is capable of infecting wheat, field beans and potato tubers.

Soil fumigation trials on 40 farms have indicated that plant parasitic nematodes, owing to low population levels, cannot generally be regarded at present as being of any real economic significance in cotton production. Two kinds of nematode, however, *Trichodorus* sp. and *Pratylenchus brachyrus*, are considered to be capable of causing severe stunting of both cotton and maize. Since these nematodes are widely distributed, further investigations are required and considerable vigilance must be exercised.

Severe phytotoxicity on citrus, groundnuts, onions and grapevines and improved growth of tobacco following soil fumigation with methyl bromide are being further investigated.

Seed services

The total number of samples received for test showed an increase over the previous year, the largest gains being in the number of cotton, soyabean, and tree samples.

Apart from routine analysis, work on seed identification, dormancy studies and viability tests continues. Fresh investigations commenced on maize seed pelleted with trace elements and on the best methods for testing tree seed.

The Seed Regulations and Seed Certification Scheme Notice due for publication in 1969 were again delayed and will now be promulgated early in the new year.

Though there was a slight decrease in the total acreage of seed crops inspected, there was an increase in the number of inspections required due to the following factors—

(a) under the new Crop Seeds Regulations, extra isolated areas have had to be set aside and inspected for foundation seed production;

(b) the implementation of the new Seed Certificate Scheme for field crops has resulted in a general tightening up;

(c) a greater number of visits were made to investigate complaints due to the increasing awareness by purchasers of the warranties assured them under the Certified Seed Seal.

The new scheme for the release of virus-free potato seed stocks into the potato industry was started on selected farms in the Eastern Districts.

The three new tobacco varieties, four wheat varieties and one soyabean variety released for certified seed production during the previous year were bulked to sufficient quantities for commercial release.

Vegetable seed production during the winter months showed a marked improvement over the previous year, an increase in production which could be a reflection of a move towards greater awareness of the value of rotations among irrigation farmers in the Lowveld.

BRANCH OF AGRICULTURAL EDUCATION

The Branch of Agricultural Education was established with effect from the 1st July, 1969, the first Chief taking up duty on the 1st September, 1969.

In addition to its responsibility to the Directorate for the two agricultural colleges, Gwebi and Chibero, and the Esigodini Institute of Agriculture (formerly Mzingwane Agricultural School, administered by the Ministry of African Education, but transferred to the Ministry of Agriculture on the 1st January, 1969), the Branch is responsible to the National Advisory Committee for the administration of the Farmers' Training Scheme, inaugurated in March, 1969, the Senior Training Officer of the Branch being the Secretary/Convenor of the Committee, and Registrar of the Scheme.

The Branch has strengthened the existing close contact with the University College of Rhodesia, and with the Ministry of Education in respect of the control and administration of agricultural scholarships and bursaries, through our own Ministry, while it will be future policy to build

up a comprehensive record of all facets of agricultural education in Rhodesia, and maintain a viable working relationship with the institutions concerned.

In view of the increasing demand, considerable progress was made with the preliminary investigations for, and the planning and implementation of additional post school certificate agricultural training in the country.

The year under review brought to a conclusion the first three-year In-Service Training Course, four of the original participants being successful in achieving the Ministry's Certificate in Technical Agriculture.

Gwebi College of Agriculture

The season's rainfall was well above average, resulting in most satisfactory cropping conditions and very good yields, as exemplified by a record 35-plus bags of maize to the acre, an all-time record, rising to over 45 bags to the acre on Arnold Field, where additional nitrogen was provided on this small piece of Class I land. The College has therefore been in a position to provide a healthy surplus to assist other Stations of the Department.

Alterations to the Hostel were completed, as was the new laundry. The sports pavilion bar was officially opened in March. An office, out-buildings and reservoir were completed at the new Variety Trials Testing Centre. Two new ablution blocks were put up in the African Compound and a flying start made on a staff cottage. The Mobil Service Bay has reached the half-way stage, the engine room is nearly complete, and the pump room has been started to provide housing for a generous gift of pumps and starter motors from Stewarts and Lloyds.

Several papers were submitted for publication by the Poultry Section, covering work undertaken during the year, and one paper by the Animal Husbandry Section on the feeding of Canex.

In the Animal Husbandry Section, the drought and frost of last year have been followed by bouts of three-day sickness and Rift Valley Fever, the over-all effect of which will be to lower calving percentages drastically in both the dairy and beef herds. However, production in the dairy herd has risen to over 12,000 lb. of milk at 3.9 per cent. butterfat per cow in milk, heifers included.

The third In-Service Training examinations were held at the College during the long vacation. Thirty-eight students sat the final Diploma Examinations in June, 1969; all 38 satisfied the examiners and received Diplomas of the College, 13 of them being in the First Class category. Of Course 20, originally 46 strong, 43 passed into their second year. Course 21 commenced with a total of 42 students, making an over-all total of 85 men in residence. The College is thus full to capacity and it must be stressed that any further increase in numbers would seriously affect the standard of practical instruction offered, but at this stage, it should be noted that no qualified Rhodesian has ever been refused entry.

Research activity is restricted, student education being the main priority. However, various investigations were undertaken in conjunction with other Departments of the Ministry.

Diploma Day was held on 16th October, 1968, when Mr. D. C. Smith, Minister of Agriculture, and Mrs. Smith were the Guests of Honour. Mr. Adrian Griffith, Secretary for Agriculture, was the Guest of Honour at the Annual Sports Day gathering. A very large number of other visitors were welcomed to the College over the year, including numerous schoolchildren ranging from 12 years of age to "A" level scholars eager to find material for a variety of projects. The Hon. Mr. C. D. Dupont, Officer Administering the Government, spent a day with the College meeting the staff and students and inspecting many of the activities undertaken in the way of student instruction.

During the long vacation, the College exhibited livestock at Marandellas, Umtali and Salisbury, the Poultry Section and Field Husbandry Section also exhibiting in Salisbury. Many awards were achieved against very strong competition.

The College, as usual, owes a great debt of gratitude to the many officers of our own Ministry, of other Ministries, and to members of commercial and industrial concerns, who assist as visiting lecturers in a wide variety of fields. Their invaluable contribution to the success of the Diploma Course is very gratefully acknowledged.

Chibero College of Agriculture

The major building development of the year was the completion of the new swimming pool, which was officially opened by the Minister of

Agriculture on the 14th February, 1969. A large crowd of guests heard the Minister pay tribute to both the many benefactors who had contributed so generously to the pool fund, and to the staff and students who had built the pool on largely a "self-help" basis. The pool is a very significant addition to the student recreational facilities available at the College.

For the first time, the College held an Open Day for farmers, on the 20th March, 1969. After the official opening by the Secretary for Agriculture, visitors were able to see students participating in practical work in the various sections, and also observed a typical lecture period in progress. Although not well attended, the visitors showed a keen interest in the workings of the College, and it is hoped to make the Open Day an annual event.

The Sixth Diploma Day Ceremony was held on the 30th July, 1969, with Sir Keith Acutt as the Guest of Honour. Eight diplomas were awarded, with J. N. Sairai of Fort Victoria gaining a distinction in Agricultural engineering. G. W. Chituku of Rusape was the winner of the Natural Resources Board Trophy for the best all-round student of Course 6, while the new trophy for farm management presented by the Standard Bank was won by R. V. Khaka of Que Que. All the Course 6 graduates have obtained employment in agriculture, and there has been an encouraging increase in demand by employers for graduates of the College.

Of the 61 first and second year students in residence at the start of the year, 36 and 12 passed through to their second and third years respectively. The second year students (Course 7) had a disappointing record, as only slightly over 50 per cent. qualified for their final diploma year. However, for the enrolment of Course 9, a new selection procedure, involving an objective "aptitude" test, has been embarked upon, and it is hoped that this will prevent the enrolment of unsuitable student material and reduce the large "drop-out" rate.

Although the season started late, and there was a mid-season drought in February, over-all rainfall was adequate (28.8 in.). A hailstorm in January severely damaged the tobacco and cotton crops, but College yield records were achieved for maize (28.3 bags per acre) and soyabeans (7.1 bags per acre). More pasture was established, and grass growth was sufficient to maintain all livestock in good condition. This was reflected in a calving percentage of 92 per cent. in the Mashona herd. Mastitis continued to be a problem in the dairy herd, and Rift Valley Fever resulted in losses and abortions in the cattle and sheep. Under the supervision of engineering section staff, a new welding bay, engineering store and two new bull pens were erected by students. In addition, the new dam filled to capacity, a 4,000-gallons per hour leak was fixed by Water Development, and development of the irrigation section proceeded smoothly.

For the first time, student volunteer stockmen participated in show activities during the long vacation. Their efforts were rewarded by the Reserve Champion Dairy Animal Award at the Gatooma Show, and Champion Junior Bull and Champion Heifer awards for Mashonas at the Salisbury Show. Exhibits of produce from the College farm also won prizes at both Gatooma and Salisbury.

Research continued along limited lines on both indigenous pigs and millet and pulse crops. A number of trials were also carried out for other Stations. An in-service training course was held during the long vacation.

As in the past, the College acknowledges with sincere gratitude the continued advice and guidance of the College Advisory Council, under the chairmanship of Dr. B. S. Ellis; the support in the form of scholarships and bursaries of numerous sponsors; and the many people who contribute in various ways to the Diploma Course at the College.

Esingodini Agricultural Institute

The first Annual Report under the Institute's new name and with this Department covers the period 1st January to 30th September, 1969. Under the Division of African Education the last report covered the period 1st January to 31st December, 1968.

The first intake of 21 students took place on Monday, the 13th January, 1969. It was decided to change from the academic year to an agricultural year. It was therefore, necessary to reduce the length of holiday periods in order to complete the first year's syllabus by the 10th September, 1969, and to commence the second year on the 1st October, 1969. Eighteen students will continue with the second year of the course.

Apart from the normal instruction and training of the students, the conversion of the original class-room block to a dining-room and kitchen was completed. This included a toilet and shower for the kitchen staff. New permanent sheep pens were constructed and a start has been made on the renewal of the cattle pens in welded sections of piping.

Redundant machinery and implements were transferred from Matopos and Gatooma Research Stations. They have been completely overhauled and are now in general use.

The buildings and stock yards have now been connected to the Ncema Dam water supply and water from the Water Development bore hole is utilized to supplement the supply for irrigation.

A start has been made on improving the surrounds of the Administration and Dairy Blocks by planting lawns, shrubs, trees, hedges and the construction of islands and the alteration of the main entrance to the Administration Block.

Two houses for instructors were completed by the Department of Works and are now occupied.

D. H. SAUNDER,
Acting Director,
Department of Research and Specialist Services.

Annual Report of the Director of Conservation and Extension

for the year ended 30th September, 1969

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ORGANIZATION AND STAFF

Organization

The year 1968-69 was overshadowed by the split of the Department of Conservation and Extension and the transfer of responsibilities for agricultural development in the Tribal Trust Lands. Prior to the actual division of responsibilities on the 1st July, a long and difficult period of rumour and uncertainty prevailed, with an understandably depressing effect upon staff morale. Once the transfer had been effected, staff were able to concentrate on the future; morale is steadily being rebuilt, but there is no doubt that, should ever a similar decision be made, the effects upon staff would be disastrous. It is, however, pleasing to be able to report that the transfer itself was effected smoothly with no disruption to the remaining extent of the Department. Particular credit must go to the Administrative Branch who were mainly responsible for the smooth transition.

It is unfortunate that cold statistical figures in no way do justice to the extent of the Department's achievements in the Tribal Trust Lands. Progress in agriculture is seldom spectacular; it takes even longer for a strong impact to be made upon less sophisticated people. Although a great deal of our good work will not really bear fruit for some years to come, the country can rest assured that within the few years during which the Department has dealt with tribal lands, agriculture left a lasting impression on the tribesmen.

Senior staff

Resignations have taken their usual toll of the Department's establishment and it is difficult to see how a more stable staff can be achieved. Salary scales have recently been improved considerably and normal working conditions can be classed as satisfactory; unfortunately, however, resignations imply an additional work burden for remaining staff. Senior staff as a whole have performed exceptionally well under difficult and trying conditions which have required them to work long and arduous hours far in excess of the call of duty. This has been done cheerfully and generally without complaint, and is an attitude reflecting a very fine spirit amongst officers. Nonetheless, it is unreasonable not to expect repercussions in the form of resignations when officers are perpetually over-burdened.

The Department is taking active steps to encourage more young people to take up agriculture as a career. The Youth Extension Section is devoting a considerable amount of its time to counselling schoolmasters and schoolchildren, in attending Careers' Days, and in general, trying to stimulate an interest in an agricultural career. The Ministry of Education allocates some 30 bursaries to the Ministry of Agriculture and these are shared primarily between the Departments of Research and Specialist Services and Conservation and Extension. Through these activities it is hoped to considerably reduce the recruitment shortfall being experienced at present.

New posts

During the year the establishment was increased by the addition of six Conservation Officers, three Conservation and Extension Officers, one Irrigation Officer and one Administrative Assistant in the Engineering Branch. The latter post is paid from the Working Account.

By the innovation of Conservation Officers it is hoped that the Department will gradually be able to build up a core of conservation officers who will undertake the main duties of mechanical conservation, land classification, etc., thereby relieving the professionally qualified extension officers to deal with advisory work.

Junior staff

Staff establishment in this section of the service has generally been good. Junior staff have worked well with enthusiasm and dedication. Older supervisors, in some cases lacking in educational background qualifications, are still highly respected in the farming communities and are imparting their practical knowledge to the newer recruits, better educated than themselves. It is expected that junior staff as a whole will be built up into a powerful team.

Housing

European staff housing has improved with the possible exception of Fort Victoria. With regard to African staff housing, however, the position is still far from satisfactory in many provinces.

Water supplies

Water supplies are often inadequate and while rain water storage tanks are being provided, it would assist greatly if the installation of gutters and tanks could be speeded up. Staff are placed in an invidious position when trying to encourage African farmers to collect roof water for domestic use when so little progress is effected in the pro-

vision of guttering and tanks for houses occupied by the staff of this Department. This only creates dissatisfaction amongst the staff concerned and displays lack of confidence in the Department's recommendations to farmers.

Transport

Most of the senior staff use private transport to carry out their duties and this arrangement has, as in the past, reduced to a negligible amount the productive time lost through breakdowns during the year.

A certain amount of controversy exists with regard to the mileage rate which many feel is inadequate and insufficient to meet the higher costs of spares, repairs and replacements.

Extension Supervisors generally use motor cycles; these have proved satisfactory since they are able to negotiate paths and tracks impassable to other forms of motorized transport.

Staff training

Staff training during the year has been reasonably satisfactory, the field officers being assisted by specialists based at province and/or head office. Some easing of the total training need was possible because the establishment included a number of tobacco trained officers adequate to the reduced acreage of that crop and, therefore, there was no need to conduct the usual in-service training in tobacco during the year. The main emphasis on the training of middle- and higher-grade officers has been in the subject of veld and farm management; the latter subject is possibly of most importance in so far as the Department's activities are concerned.

Visits to other countries

Study tours have always been recognized as an effective means of keeping the Department informed of current developments and as an excellent means of maintaining staff morale.

Regrettably, staff visits to other countries were drastically reduced during the year. The number of study visits declined from 25 in 1967 to 23 in 1968, and finally to 14 during this year—only one of which was to an overseas country, compared with seven in 1967 and five during 1968. South Africa and Malawi were, however, most co-operative and we were able to meet requirements in this field through the services offered in these countries.

The overseas tour was facilitated by the fact that the particular officer returned from vacation leave via the Netherlands. Visits are listed in Appendix I.

Boards, Meetings, Conferences, etc.

In accordance with past practice, officers of the Department attended large numbers of meetings, etc., during the year and provided a service which is greatly appreciated by the various outside bodies concerned. See Appendix XI.

Staff activities

Generally, it is most pleasing to note the consistent upward trend in the fields of direct contact with the farming public.

True extension in terms of livestock and agronomic advice including farm and veld management showed an over-all increase of over 5 per cent. of officers' time.

Soil and water conservation activities and extension liaison have shown a steady improvement amounting to more than 6 per cent. over the past two years and this accounted for an expenditure in excess of 21 per cent. of staff time during the year.

Time spent on irrigation advice declined by nearly half to 6 per cent., field trials by 0.7 per cent. and, happily, inspections accounted for only 3.9 per cent. of time—a fall-off of 61.9 per cent.

Less time was occupied at staff conferences—1.8 per cent. less—and administration (time spent in office), but attendance at farmers' organizations, training courses, census and the preparation of publications all showed an upward trend and accounted for an increase of 3.8 per cent. of time expended.

The whole tenor of the trend reflected in this analysis of time expenditure is extremely gratifying. A detailed statement is set out in Appendix X.

THE YEAR, THE LAND, DEVELOPMENT AND PROTECTION

The weather

The year under review provided a most welcome change from the 1967/68 season. Good rains were experienced in most parts of the country, and, in considering rainfall, water supplies, veld grass, conditions of cattle, and the mild winter tempera-

tures, the majority of farmers described last season as "the best for years". Early rains facilitated satisfactory land preparation and the planting of major crops was complete by mid-November. In some areas, however, an unusually cold overcast period occurred during November, which proved disastrous to livestock and wild life, particularly in the southern areas of Rhodesia. A large number of domestic cattle and wild animals succumbed to the sudden change in temperature. It is estimated that 56,000 head of cattle died in Victoria Province, mainly in the Tribal Trust Lands; the toll of wild life was also reported to be extremely high. During late December and early January there were reports of too much rain, while some areas reported almost drought conditions during February and March.

During the latter half of March and April, above average rainfall was recorded in most areas. On the whole, the season was extremely satisfactory with reference to the rainfall and no heavy frosts were recorded.

SOIL CONSERVATION

Arable areas

Mechanical protection works on arable land in European areas is extensive but a considerable amount of sub-standard work exists, both in the contruction and maintenance of contour ridges and storm drains; this has become very evident as a result of the heavy rains during the season under review.

Unfortunately, many farmers consider the design requirements of contour ridges to be excessive, and tend not to build them to specifications; the result is that overtopping and damage occurs in a heavy rainy season or during exceptional storms. It would appear that there has been a general slackening off of concern for the mechanical protection of the soil. It is essential that the staff of this Department, I.C.A. Committees and individual farmers should appreciate the seriousness of the position and the need for this to be remedied as soon as possible. Fortunately, biological conservation was effective during the past season, particularly in the maize lands where exceptionally heavy crops were grown. Unfortunately, on the other hand, tobacco farmers who had diversified to cotton experienced the ravages of erosion which can occur on sandveld when the soil is not protected by a good crop cover; this was, in many instances, aggravated by inadequate mechanical measures. Some farmers have been so perturbed at the effects of erosion that they are determined not to plant cotton on sandveld again.

It is regretted that some farmers have ploughed out existing conservation works, thus throwing unnecessarily heavy burdens on our depleted staff who have to repeg a considerable area of land annually. This lack of consideration for staff is also an abuse of a free service, and this could be overcome by strong action initiated by the I.C.A. Committees. Time is of the essence as far as field staff are concerned; every effort must therefore be made to use their time profitably, and particularly to obviate the necessity for re-pegging lands.

The provision of mechanical protection measures is proceeding apace in Purchase Areas and Tribal Trust Lands. Land Inspectors ensure that there is no serious lagging in effort and that works are properly maintained. Biological protection, however, leaves a great deal to be desired, though the position is improving in the Purchase Areas. In the Tribal Trust Lands the standards are still very low and few, if any, of the cultivators have any real interest in, much less an understanding, of soil conservation and its requirements.

The enormousness of the pegging programme during the year is illustrated in Appendix V which details the work done in the various provinces. In all, 16,104 miles of contours and storm drains were pegged—including over 9,000 miles in the tribal areas prior to the 1st July. Of the total pegged, only a little more than half is estimated to have been constructed during the period under review. Although the bulk of the uncompleted work lay in the tribal areas—and much of this may have been completed since July—approximately 800 miles of contours were uncompleted in the farming areas at the end of September.

Veld management

Following on the report of the Working Party on Veld Management, further consolidation of departmental policy has been brought about by staff training courses whereby the majority of Conex staff are now in a position to undertake and competently advise on veld management planning; this has tended to stimulate the already considerable public interest in the subject. Eighty-seven veld management courses and discussion groups held throughout the country were attended by nearly 1,600 farmers, and the demands for veld management planning thus stimulated are greater than existing staff can handle.

The successful completion of the Veld Management Conference in Bulawayo plus the tour of South Africa by members of Conex and Research staff have not only elucidated thinking but have also provided much needed up-to-date publications on veld management for public consumption.

There is no doubt that the image of Conex in the public eye as far as veld management is concerned has been fully restored and, provided field staff can be kept up to strength, great strides will continue to be made in the implementation of sound veld management practices throughout the country. It is most gratifying to be able to record this and to see the growing awareness of the damage which has been done to the veld and soil in the past.

This interest in veld management is illustrated in Appendix XIII. It is satisfying to note that 426 farms in the European areas are already operating improved veld management systems designed by this Department, and that another 265 applications for planning have been made. In terms of percentages, 8.8 per cent. of the European farming area is now operating under improved grazing systems and another 13.2 per cent.—or nearly 6,000,000 acres—will have been covered when present applications have been dealt with.

An interest in better veld management is also growing in Purchase Areas but lack of finance retards implementation.

The position in tribal areas is far from satisfactory. Notwithstanding, Victoria province appears to be achieving a breakthrough, and requests for plans to improve grazing management have grown considerably.

Bush encroachment is a large scale problem not yet tackled seriously to any extent. The present interest in veld management practices will, however, have a material effect on the attitudes of farmers towards the bush problem.

The incidence of veld fires has been lower than usual. The adoption of fire plans by an increasing number of I.C.A.s has largely contributed towards this improved position.

An increase has been made in funds available to the Natural Resources Board for reclamation works under sections 43 and 70 of the Natural Resources Act but the funds still fall far short of requirements if a reasonable rate of stabilization is to be achieved.

Rhodesia Railways, Ministry of Roads, Ministry of Transport and Power and Road Councils continue to co-operate in the application of conservation practices.

WATER CONSERVATION

Dams

There has been a considerable decrease in the number of dams built during the year, as compared with the number built in previous years; similarly, the total capacity of dams built during the year is well below the capacity of those built in previous years. If the increment is below average, this reduction is not a reflection of the general situation but rather of that in the lower rainfall areas. This is surprising. It would have been reasonable to anticipate that the severe droughts of recent years would have given impetus to the building of more dams in the lower rainfall areas, to conserve water at almost any price as insurance against future droughts. When the national position is analysed by examination of provincial statistics—as detailed in Appendix VI—it will be found that the number and capacity of the dams built in the higher rainfall areas this year are little changed when compared with previous years.

The Farm Irrigation Fund has done a great deal in assisting farmers to provide schemes for irrigation and cattle watering, and most of the larger dams built during the year were constructed under this scheme.

Considerable numbers of small dams were built in the Purchase Areas, many of them with financial assistance from the African Loan Fund. These dams are mostly small in area but often have adequate depth to ensure a useful water supply throughout the dry season.

In the Tribal Trust Lands, 43 dams with a total capacity of 146,000,000 gallons were constructed, the average capacity being only 3,400,000 gallons when compared with 11,500,000 in the Farming Areas.

Piped water schemes which supply water from permanent sources to areas which could not otherwise be developed are still popular in the ranching districts, and are doing much to extend the grazing areas. Boreholes are also popular where underground supplies are adequate.

FIELD TRIALS AND DEMONSTRATIONS

The Department conducted 12 critical field trials on farms and in the tribal areas on behalf of the Department of Research and Specialist Services during the year, and 11 Bush Control Demonstration Plots on our own behalf. These are detailed in Appendix VIII. In addition, the Engineering Branch continues with its tillage trials which are scheduled to continue at various centres for several years.

Test demonstrations

During the period of responsibility for advisory work in the Tribal Trust Areas, test demonstration plots were laid down and supervized by staff of this Department; responsibility for these were handed over to the Ministry of Internal Affairs on the 1st July this year.

This Department continues to be involved, to a greater or lesser degree, in trials with angora goats, in grazing management trials as Masera, Lupane, Tuli and de Beers Ranch, and in a phosphate trial at Somabula.

SPECIAL ACTIVITIES

Engineering

A considerable amount of time has been devoted to problems which have arisen due to the diversification of farming enterprises. Diversification, linked with the increasing input costs and static or decreasing incomes, has had a considerable influence on the farmers' attitude towards conservation and the working of this Branch in general. Primarily, work has been devoted to guiding and assisting farmers in overcoming their difficulties and trying to improve their profit margin.

A serious shortage of engineers continues, particularly Civil engineers; important investigational projects can, thus, not be commenced and advisory work is considerably curtailed. Nevertheless, it is felt that investigations into the utilization of vlei areas should be resumed and a conservation engineer is accordingly studying an advanced course in hydrology which should provide more fundamental knowledge in this all-important subject.

When responsibility for extension activities in the Tribal Trust Land Areas was transferred to the Ministry of Internal Affairs, three mobile engineering training units were handed over to that Ministry and one was retained with this Department. While a considerable amount of very useful work has been done by these units, their efficiency is now impaired by a lack of adequate supervisory staff. This matter is now being carefully examined.

Farm Machinery

A highlight of the year was the Department's final acquisition of a portion of the Hatcliffe Estates. The prospect of an Agricultural Engineering Centre is now becoming a reality and has given a considerable boost to the morale and enthusiasm of the officers of the Branch. The Hatcliffe Centre will be operated in conjunction with the Standing Committee on Agricultural Mechanization.

Tillage Trials

No new tillage trials have been laid down but work will commence on Hatcliffe Estate on depth of ploughing trials similar to those at Domboshawa. The Hatcliffe trials will be directed towards the heavy red soil problems.

Development and Testing

This work has been somewhat curtailed due to lack of staff but it is pleasing to note that, consequent to the work which was done on knapsack sprayers for the Rhodesia Cotton Growers' Association in conjunction with S.C.A.M., the Standards Association of Central Africa has produced the first comprehensive standard specification in the world for knapsack sprayers. (Central African Standard No. N6: 1969.)

Practical investigations related to crop drying problems continued and in addition, a bibliography of world literature on crop drying was opened. It is believed that this latter project will be of considerable value to local manufacturers and others concerned with the design and performance of crop driers.

Extension

The World Ploughing Contest at Norton stimulated enormous interest in better ploughing. It has resulted in a considerable demand for staff to assist at ploughing clinics and for advice, demonstrations and judging at competitions, all of which is intended for encourage the art of good ploughing so vitally necessary if good crops are to be

obtained. An increasing interest in the reduction of land preparation costs by elimination of any unnecessary tilling or tilth preparations has also developed. Interest has presumably been created by the publication of papers produced at the Tillage Symposium, and work at Domboshawa and now at Hatcliffe.

Indications are that input costs can be reduced by £1 or £2 per acre and, at the same time, it would appear that yields have been increased; these however, are long term experiments and it would be presumptuous to draw firm conclusions at the present time.

Training

The demand for machinery training courses at Domboshawa and by the mobile training units in the field continues to exceed what can be provided with existing staff. The greatest need is for training European farmers, farm managers and assistants, but there is reluctance on their part to undergo training or an inability perhaps, to recognize the value of the courses. Instruction was given to 181 operators including 69 members of the Department's staff at Domboshawa at 17 five-day courses. The mobile units ran 213 two-day courses attended by 2,794 African farmers and 135 extension staff.

The Department's courses have gained a reputation beyond the borders of Rhodesia. The Malawi Government has expressed interest in the courses with a view to introducing similar training there.

Farm Buildings

The past year has been primarily concerned with bulk handling of maize. The advent of handling maize in bulk in local and farm situations has brought farmers face to face with problems about which they were previously unaware. Some of these problems have now been investigated and systems evolved to make bulk handling of maize a comparatively simple and cheap operation. Several field days dealt with this subject and results have been gratifying.

The experience gained by all concerned will prove invaluable when further bulk storage depots are installed.

Conservation Working Account

Very good rains during the year and the over-commitment of the Farm Irrigation Fund in the previous season resulted in fewer requests for dam building after the rains, and a consequent shortage of work for the machines. The position improved later, but not as much as was expected. Nevertheless, a profit of about £3,000 was made for the year.

These units constructed 131 dams in the Farming Areas and 27 in the Tribal Trust Lands during the year. More detailed information is contained in Appendix VII.

During the year, the Department had to increase its charges to farmers and, at the same time, attempted to absorb some of the extra costs by increased efficiency.

The loyalty, team spirit, enthusiasm and dedication to hard work of the Working Account personnel deserve mention. Operating in extremely difficult conditions, they have developed the art of dam building and bush clearing in particular to a very high standard. Moving soil when dam building for less than 2s. per cubic yard in many instances, is outstanding efficiency.

HUSBANDRY

Though fully staffed for only part of the year, the over-all position was fairly satisfactory. An Assistant Apiculturist was appointed in December but left to undergo National Service a few months later.

A considerable amount of time was devoted to assisting farmers with diversification programmes and veld management in particular. Numerous in-service training courses were run for the staff, and specialist officers participated in a large number of field days for their own training and dealing with their respective subjects. The essential theme of this work was to improve their own specialist knowledge and to raise the standard of efficiency of field staff.

The Senior Apiculturist visited Thessalonika, Crete and Kalamaki and, during August, attended the 23rd International Congress on Apiculture, in Munich, Germany.

Pests and Weeds Advisory Services and Inspectorate

A total of 5,306 inspections were made under the Plant Pests and Diseases Act, 1958, and the Noxious Weeds Act [*Chapter 190*]. During the year 33 prosecutions against farmers who failed to comply with the regulations under the Plant

Pests and Diseases Act were finalized. Some 2,261 inspections were carried out mainly concerning lantana, salvinia and water hyacinth infestations. Lantana continues to be a problem in many areas and persons responsible for the land are continually being pressed to clear these weeds. A small infestation of water hyacinth was found in a number of rivers and steps were taken to clear the plants. The infestation of 15 miles of the Tsungwesi River with salvinia during the previous year did not show signs of reinfestation.

Irrigation

The late rains restored river flows to normal very effectively and filled dams which were virtually empty at the end of February, and a general improvement in the water situation resulted in the Sabi Complex, the Kyle, Bangala Complex, Manjirenji Scheme and the Umshandige Scheme. Late rains saved the situation on the Shashi-Limpopo and at the pumping schemes in Matabeleland, where water availability had become critical. The Plumtree area where Mananda dam received virtually no run-off was an exception, and consequently, winter crops could not be irrigated.

Staff of the Department paid particular attention to in-service training and farmer training in general. One specialist left to study a post-graduate course in soil and water engineering with particular reference to irrigation, and will be absent for several months.

Schemes under investigation

All specialist officers—particularly those based at provinces—have received more requests for investigations and advice in connexion with the Farm Irrigation Fund schemes and privately financed schemes than they can deal with. Now, however, in-service training enables much of this work to be competently handled by Group and Extension Officers.

Farm schemes handled, varied from five acres based on borehole supply, to large-scale enterprises such as the Oppenheimer Ranch Scheme of some 600 acres and the Madirisa (Pvt.) Limited 700-acre scheme; the majority of the schemes, however, cover between 40 to 100 acres.

Government schemes investigated during the year were:

Mayfair-Filabusi—a proposed dual scheme to supply Bulawayo Municipality as well as local agriculture.

Sherwood Block/Bonstead — the enlargement and development of an existing scheme.

Suri Suri—provision of water for the mining industry and for agriculture in Hartley district.

Mazoe Valley—investigations for a reappraisal of the lower Mazoe Valley Scheme.

Schemes completed

A considerable number of farmer schemes were actually completed during the year and extra effort was made by staff to give all possible assistance to schemes associated with the Farm Irrigation Fund, in order that they be brought into operation as soon as possible. In addition, a Government scheme was completed in the farming areas of Insiza, Fort Rixon.

Observation on the irrigation of crops

Maize and cotton gave fair to good results from earlier plantings, especially where farmers restricted the irrigable acreage to that which could be adequately watered during the high evapotranspiration periods of January and February.

Groundnuts under irrigation were inexplicably poor. Lucerne on the other hand, enjoyed the hot dry summer and mild winter, and yielded well.

Wheat harvesting was underway at the end of the year and bumper crops are expected, though this cannot be confirmed until delivery has been made to the miller. Rust was almost non-existent but quelea damage was severe in certain areas. Much of the wheat planted would have given even higher yields had it been planted earlier. The late planting of wheat was caused through late harvesting of the preceding maize crop which, in turn, was due to slow drying after late rains. This illustrates the advisability of having the irrigation scheme designed so as to give an adequate reserve of land for cropping.

Detailed acreages of the various crops irrigated are listed in Appendix XII. It is interesting to note that the irrigated cotton acreage exceeds that of any other annual crop. It is also worthy of note that the total area under irrigation has roughly doubled to nearly 160,000 acres during the last six years.

Observations on methods of irrigation

It is easy to discern a substantial improvement in general standards of irrigation as practised by

farmers throughout the country. This can be credited to the extension efforts of the Department as a whole, as well as to a genuine desire on the part of the farmer to be "with it" in regard to latest trends in irrigation. There has been good support for, interest in and participation in various symposia, field days and discussion groups held for farmers throughout the year. The high standard of questions raised are clear indication of their wish to reach the highest standards of practical efficiency. There is evidence of a breakthrough in the irrigation of deciduous fruit, in giving specific irrigations at critical stages in the growth cycle—e.g. flowering, petal fall, fruit swell —rather than by mere scheduling. In this connexion, the withholding of irrigation at pip hardening time on certain dessert peach varieties, together with nitrogen control, has appeared to have completely eliminated the serious problems of split pip. It was also very noticeable during the season that growers who do not follow the recommendations to apply post-harvest irrigations during the period April-July in order to prevent stress conditions have obtained a poor set of peach crops. There is, however, no room for complacency since a big gap still exists between the average and the highest standards achieved in the field. It is pleasing to report that, but for the exception of a few diehards, most farmers are clamouring for advice on the most up to date techniques.

Irrigation development in the Tribal Trust Lands

Specialist officers now act as advisers and not as designer-constructors in the Tribal Trust Lands. A considerable degree of advice will still have to be given to the Ministry of Internal Affairs with regard to irrigation techniques and the running of in-service training courses for their staff.

PLANNING

The Chief Planning Officer resigned from the service during the year and a certain amount of reorganization followed. After adequate training, a number of staff were transferred from head office to the provinces to provide specialist services, particularly in farm management.

Planning

The Farm Planning programme has not gone ahead as well as it should have, primarily due to the lack of field staff. Just under 50 farm plans were completed, mainly in the European areas of Mashonaland North. Farm plans in the Purchase Areas are shown in Appendix IX (Table 3).

Regional plans

Following the completion and publication of the Melsetter Regional Plan, the planning of the Mazoe Group covering some 1,500,000 acres was undertaken, and soil and agro-ecological maps were completed. In addition, planning of the Marandellas Group consisting of over 1,000,000 acres was initiated; soil, vegetation and altitude maps have been completed.

Soil irrigability surveys

Two reconnaissance surveys, the Lower Mazoe Irrigation Survey comprising some 35,000 acres, and about 800 acres of potentially irrigable soil in the Chiduku Tribal Trust Land were completed.

Settlement surveys

Sipolilo A—79,000 acres, soil classification and viability.

Mtoko A—46,000 acres, soil, vegetation and viability survey.

Copper Queen Purchase Area—140,000 acres, detailed soil and vegetation surveys.

Farm Management and Work Study

A great deal of intensive in-service training was devoted to the farm management and work study aspects of our extension activities during the year; this aspect of the Department's work can now be serviced by 60 field officers supported by specialists in all provinces and at head office.

The Farm Management Section has always worked very closely with the Rhodesia National Farmers' Union Farm Management Advisory Services and it is hoped that in the future this relationship will be even closer. It is obvious that if the Management Advisory Services can provide the bookkeeping facilities for the farmer, officers of this Department should be in a position to use the individual farm returns to indicate the profitability, or otherwise, of the farmer's various enterprises. This would enable the farmer and field officer to work out an improved farming system for the holding.

Farming is a business

In conjunction with the Rhodesia National Farmers' Union, seminars were held during the year at Nyamandhlovu, Belingwe, Umtali and Chiredzi, each of which had an attendance of

about 50. In general, the seminars were much more successful than those held in 1968. Meetings of this nature are extremely important, since farmers are quick to appreciate the current and future importance of farm management as a subject which concerns them intimately.

Air photo interpretation

Work intensified to investigate the utilization of aerial photographs for the location of possible dam sites, particularly in the Mazoe and Salisbury South areas.

An experimental flight arranged through the Surveyor General's Department provided full colour photographs for a complete portion of Rhodesia to a scale of 1 : 25,000. The photographs are now being studied to evaluate their use as compared with black and white photography.

Statistical mapping: European farming areas

Base maps are being prepared for use in statistical mapping of the major features, development problems, etc., in the Farming areas. Once this is under way, attention will be turned to the Purchase areas. This work had already started in the Tribal Trust Lands prior to the transfer of functions to the Ministry of Internal Affairs.

TRAINING

Training Branch suffered more than any other as a result of the transfer of responsibilities in the Tribal Trust Lands to the Ministry of Internal Affairs. This involved a reduction in Branch establishment from 47 to 25, primarily as a result of the transfer of the three training institutes—Alvord, Kayisa and Rowa—to the Branch of Community Development Training in the Ministry of African Education. In addition, four Youth Extension Supervisor posts and their incumbents were transferred to Community Development Training.

The Department has concentrated on Group level training in various aspects of extension and extension methods during the year; this has proved particularly effective, both with the farming community and staff.

A reorganization of the training syllabus requires that all officers joining the Department will have to undergo training in mechanical conservation; land use planning; principles of farm management and work study, and extension methods. In addition, a substantial number of courses covering the whole range of subjects dealt with by the Department will be provided, and these are reflected in Appendix IV B.

Special conservation courses were held for the Lands Inspectorate during the year. Lectures were given by staff at the University College, Ranche House, and the Branch of Community Development—for both rural and urban workers—and to numerous organizations such as the Federation of African Women's Clubs. In addition the B.S.A.P. have utilized the services of the Department with particular reference to extension methods.

Close co-operation has been maintained with the Natural Resources Board and particularly with the Resource Education and Conservation Education Committees in a campaign to create an awareness of the importance of the veld in African areas. Assistance was also given to the Board in producing the film "Your Grass, Your Land and You". Collaboration with the Board also involved vacational courses for school teachers.

Training institutes

Prior to the transfer, the four institutes were working to a capactiy programme and reported 18,972 trainee training days, which are detailed in Appendix IV A. Courses for chiefs, headmen, kraal heads, etc., have subsequently ceased to be the responsibility of the Department and, during the latter part of the year under review, 1,326 trainee training days have been reported from the one remaining training institute, Domboshawa.

Freedom From Hunger Campaign 'buses

This innovation—made possible a few years ago with the generous help of funds from the Freedom from Hunger Campaign—has proved exceptionally successful. During the first nine months of the year, six 'buses carried 13,433 passengers nearly 80,000 miles on trips that were mainly connected with courses and associated field visits. Five of the 'buses have now been transferred to the Branch of Community Development Training and one 'bus remains with the Department.

During the latter three months, this 'bus has carried 424 passengers for a total distance of 1,317 miles.

Mobile training units

The fleet of five units—four of which have now been handed over to the Branch of Community Development Training—did excellent work during the year, and it is estimated that, with the aid of slides, films, etc., 142,000 people were contacted through short visual courses. The single unit retained by Conex has contacted over 3,000 people since the 1st July, mainly in the Tribal Trust Lands where existing commitments were being fulfilled.

Extension research

Much of this aspect of the Department's work related to commitments initiated in the Tribal Trust Lands prior to the transfer of functions in July.

Investigation into an agricultural index of farmer performance in the Tjolotjo Tribal Trust Land started as a pilot exercise. It is expected that techniques developed will subsequently be used in the Purchase Areas and, with modification, eventually in European areas.

Considerable assistance was also given to S.A.R.C.C.U.S. in its efforts to resolve problems of traditional land tenure and development.

Investigations into the efficiency of mass media in extension have been initiated with first attention being given to local newsletters, and the whole farmer-extension service relationship is being appraised.

Natural Resources Board grazing area campaign

This campaign, conceived by the Natural Resources Board, was planned in depth and very great detail with the assistance and guidance of this Department. Although the campaign could not be implemented entirely as planned, good progress has been made, and it is pleasing to note the degree of interest in our grazing areas that has developed, not only in the Tribal Areas which was the initial target, but also in the Farming Areas and with the public generally.

Home economics

Assistance has been given to numerous womens' organizations and clubs, particularly in the sphere of nutrition. The preparation of bulletins and pamphlets, talks to womens' groups, and attendance at conferences and similar gatherings have fully occupied the time of the Home Economics Officer during the year.

Mass media

Radio—African Services: The activities of the Department in the preparation and recording of discussions and interviews for broadcast over the African Services of the Rhodesia Broadcasting Corporation were doubled during the year under review. Weekly 25 minute programmes are prepared both in Shona and siNdebele. This service has been very well received by African farmers but if the siNdebele aspect of our activities are to be continued, an African officer must be appointed in Bulawayo. The Department has had to rely on other ministries for assistance in the translation of English scripts and for conducting interviews with successful farmers, since our own officer was transferred to another ministry in July.

The co-operation with staff of the Rhodesia Broadcasting Corporation is excellent but the whole operation could be made easier and more efficient if the Department had its own portable field recording unit.

Papers and publications

A large number of papers and publications were issued both for the public and staff. The quality of these publications has improved considerably during the year and all credit is due to the officers concerned. The large number of articles written by staff is reflected in Appendix II.

Films

The Natural Resources Board film "Your Grass, Your Land and You" has already been mentioned.

Youth extension

This section released four Youth Extension Supervisors to the Branch of Community Development Training and the whole programme has undergone revision since 1st July. Activities are now concentrated more on conservation education and to establishing contact with schools, Education Departments and Teachers' Training Colleges with the object of involving educationalists with the current problems of conservation. Another slant is given to attracting youth towards joining the Department and making it their career. These have culminated in a series of Careers Days which were held in Salisbury, Gatooma, Marandellas and Que Que.

Numerous Young Farmers' rallies have been organized and attended—the largest rally was held at the Alvord Institute for all the Victoria

Clubs—and while the number of European Clubs has dropped to 32, the number of African Clubs increased to 535.

LAND TENURE ADVISORY SERVICE

Observations of farm sales during the year indicate that a trend has now developed toward consolidation to larger farms in every part of the country. This trend is mainly due to the expansion and consolidation of the farming businesses of existing and successful Rhodesian farmers. Few immigrants were involved in the purchase of farms capable of production in excess of £25,000 per annum, whilst many of the land purchases are concluded for consolidation with existing farms, and are designed to achieve much larger scales of production.

One of the problems with which immigrants appear to be confronted is that, while they have the ability and often have large sums of money in their own country, they are unable to bring it into Rhodesia due to exchange control, and subsequently, they are unable to obtain long term credit in this country. The purchase price and rents still reflect the profits obtained in the past, and many owners do not appear to accept the change in economic circumstances. In addition, many prospective tenants are still far too ready to agree to rent levels which anticipate exceptionally high gross margins on farming enterprises.

Advice to new farmers

Inquiries for farms have come from many parts of the world, primarily from South Africa but also from the United Kingdom, Switzerland, North America, Germany, Australia, Italy and Denmark. Almost 200 inquiries have been dealt with and, not included, are those merely asking for free allocation of crown land with credit to farm it. The total figure, including these latter requests, would be well over 350 as compared with a figure of 260 for the 1967/68 year.

Census

A census of farms, farmers, children and possible inclinations of the children to take up farming was initiated during the year. This survey was not finally completed by the end of the reporting year but the information obtained should be very useful in trying to assess where the farmers of the future are to come from.

SERVICES

While the events of the year have been unsettling for staff and unpropitious for extension work, it is pleasing to note that the Department's field activities have been more in accord with extension philosophy than has been the case for some time. There is better understanding of the inter-relationship and inter-dependence of the various methods of approach to farmers whereas previously one method was frequently compared as better, or worse than another, and their complementary nature was lost sight of.

Of particular significance has been the regenerated interest in group methods. The year, so difficult for Conex, has been even more difficult for farmers, who, in present circumstances must analyse and solve the many and complex problems that characterize the Rhodesian farming business scene today. More than ever before, group extension is an essential for any programme. It is therefore satisfactory to note that not only has this approach been employed on an increased scale but the quality of the extension work being done with groups is of high standard. Field staff recognize that the group situation can make a substantial contribution to the solution of farming problems and more and more officers are planning their work around and with farmer groups. They are sensitive to the factors that contribute towards an effective group situation. Officers have organized groups, taking into account social affinities as well as common agricultural interests. There is also an appreciation of the importance of group size; groups nowadays tend to be small and intimate to allow for full participation by all members if there is to be full benefit from the group situation. The actual magnitude of the number of farmers attending any field day or demonstration was frequently used as a measure of extension success; it is unlikely that officers would use such a criterion only, nowadays. Awareness and interest in a topic can undoubtedly be stimulated in a large audience but detailed understanding and solution of problems needs the climate of a carefully chosen small group. Farm and veld management and other important subjects have been effectively promoted through group extension.

The improved employment of group techniques has had an added beneficial effect; visits to individual farmers have become more meaningful extension. The interview is the logical continuation of group work and satisfies the need

for attention to local and personal aspects of a problem, already dealt with generally and which can be effectively pursued by two people with common experience of earlier discussions. Officers now report that their farm visits are more purposeful and that farmers who participate in the kind of groups mentioned, work objectively with them, and do not expect the "Conex man" to provide them with a "personal service" which all too often meant something done *for* the farmer but without his involvement.

The services provided through mass media are not yet fully integrated with current extension programmes. There has been an increase in the amount of time available to agriculture with the advent of a new weekly half-hour programme. Generally topical, the material provided is not specifically related to any current extension programme. With adequate staff and the proper equipment Conex could make more effective use of "air time".

Similarly, while we provide much material for the national and farming press, as yet we do not programme for the use of this medium.

However, a good start has been made to improve communication with farmers by means of local newsletters and these have been improved both quantitatively and qualitatively. Surveys to establish the existing newsletter (occurrence and content) situation are being conducted and, stimulated by the arrival on the scene of a publisher who will produce a newsletter in exchange for advertising space, staff are keenly interested in extension by topical local publicity.

It is analogous to Rhodesia and the country's current position on the international scene, that the stress to which Conex has been submitted during 1968-69 has, in fact, probably been responsible for our service being given better direction and efficiency.

A record of general extension work in the Purchase Areas is shown in Appendix IX (Table I).

Agricultural shows

The Department collaborated with the Ministry of Information in the staging of exhibits at the Umtali, Gwelo and Bulawayo shows which featured veld management. At the smaller shows, Conex itself staged exhibits.

CROP PRODUCTION

Maize

The good rains experienced during the year were generally beneficial for maize production, although the cold spell in mid-November led to the manifestation of a number of trace element deficiencies. The mid-season drought—which was experienced away from the watershed—reduced many crop yields to well below the potential indicated in January, but nevertheless, good yields were obtained by most growers.

Cob worm was more prevalent than normal, and diplodia and other cob rots were apparent and resulted in much of the maize delivered to the Grain Marketing Board being graded "B".

Sorghum

Most of this crop is now grown by Purchase Area farmers in the middle and high veld areas, although a small acreage is grown by European farmers, particularly in the Gatooma area as a substitute crop for maize. Sorghum is often grown when it is too late to plant maize but even under these conditions is somewhat neglected. Management preference is given to maize, tobacco and cotton when both crops are grown.

Munga

Because of drought in the previous season, large acreages of this crop were grown in African areas.

Wheat

Wheat was grown almost entirely as a winter crop and, in consequence of ample water supplies, the acreage showed a substantial increase over last year. As in previous years, some three-fifths of the acreage was grown in the lowveld. Although a fairly mild winter was experienced, without frost, an average yield of approximately 16 bags per acre was obtained throughout the country.

Barley

This minor crop is grown chiefly in Manicaland and Victoria provinces for malting purposes.

Rice

Rice was again under irrigation in the lowveld and an average yield of 22½ bags per acre was recorded from the Chiredzi I.C.A. Some crops,

however, were seriously affected by late rains; increased acreages are, however, being planned for next year.

Groundnuts

The acreage planted to groundnuts in European areas was about half that of the previous year. Dryland crops in the higher rainfall areas proved to be generally disappointing, although some irrigated crops in warmer, dry areas proved exceptionally good; such areas were Chisumbanje, Matopos and Lupane. Late rains affected the quality of the nuts, both from yield and grading viewpoints, and mouldy kernels had to be hand sorted in many cases. Indications are that a further reduction can be expected during the 1969/70 season.

Soya-beans

The 1968/69 season saw an increase in acreages planted to soyabeans and the average yields obtained appear to be between five and six bags per acre higher than in any previous year. Although the growing season was good for soyabeans, heavy late rains resulted in abnormal late weed growth and some cases of purple seed stain occurred. The potential for increased yields in future years is good with the newer high yielding varieties and better farm management. Present indications are that the 1969/70 crop acreage could be double that of the past year.

Edible Beans and Peas

Most of the edible bean crops on European farms were grown for domestic consumption, but a large selection of table beans was exhibited at shows in Purchase Areas. This is encouraging, since it is an indication of the inclusion of legumes in crop rotations.

It was a good year for green peas in the Manicaland province and average yields of three to three and a half tons per acre were attained. This is in contrast to the low figure of 1.42 tons per acre reaped last year, largely as a result of the extremely cold conditions experienced.

Potatoes

The acreage planted to potatoes increased slightly but late blight was severe and the first irrigated crop resulted in poor yields and high market prices.

Cash crops

Cotton

The acreage planted to cotton increased dramatically throughout the country on a variety of soils from light sands to heavy clays and, in some instances, at marginal altitudes. Heavy rains during the season emphasized the hazards of growing cotton on sandier soils and steeper slopes. In many instances, severe erosion occurred due to rain drop bombardment and poor soil cover at early stages of growth. During the cold spell in November, root development and growth ceased and plants generally looked poor. These conditions were particularly responsible for poor performance of certain herbicides, and owing to a lack of hot sunshine, weeds were difficult to kill by other means. The long mild latter half of the season resulted in a good middle and full top crop; shortages of bottom crop due to the cool start of the season did not show up remarkably. It was a particularly rewarding season for those farmers who water planted their crops.

Because of the long growing season, as many as 20 insecticide spray applications were necessary. The popularity of mist blowers and aerial spray applications continues to increase. As in previous years, American boll worm was most common and persisted throughout the season. Late rains caused considerable damage to open cotton especially in the lowveld, and, in some instances, seed was germinating on the plant before the cotton could be harvested. Because of the large acreage grown, contract labour for picking was in short supply, resulting in the continuation of this operation well into September.

Tobacco

Seed beds were slow in growth and, in many cases, uneven. Most of the crop had been planted on the highveld by the middle of November but in other areas, planting was later than usual. In consequence, reaping commenced later which made it difficult for many to reap their primings before these became over-ripe. Curing was simple at first, but, because of late rains became more difficult as the season progressed. The number of European and African burley growers increased, mainly in the northern parts of the country, while the main problem encountered was the usual lack of barn accommodation; high humidity due to late rains caused some curing difficulties. Nevertheless, the number of European growers is expected to

increase during the coming season. All the Oriental Tobacco crop was grown by African farmers and most of these were in Victoria Province. Small acreages of cigar filler were grown, average yields amounting to approximately 1,600 lb. per acre.

Sugar Cane

Cane production continued to be satisfactory in the main growing areas of the country.

Sunflowers

The acreage planted to sunflowers continued to be fairly static and average yields of approximately 12 bags per acre were obtained.

Seed crops

Seed crops are generally grown on contract, sometimes for direct export; only small acreages are grown. Seed bean production is centred in the lowveld.

Horticultural crops

Deciduous fruit

Yields and quality of peaches were variable and some market problems occurred. Nectarines of exceptional quality were marketed but apricots were only fair. Crown gall was diagnosed in many orchards in Manicaland and led to a reduction in yields. This disease, which appears to be imported, may well devastate orchards and seriously affect the industry. Some 170,000 trays of peaches were produced, 12,000 of nectarines and 5,000 of apricots.

Citrus

The larger, older established citrus groves remainded in production, while smaller acreages were established for domestic and local consumtion.

Viticulture

Vines are grown most numerously in the Intensive Conservation Area of Umtali North and in parts of Matabeleland and Mashonaland where a significant interest in this crop has been shown. Vines could provide a valuable asset on small farms where irrigation is available. Umtali North area where 66,000 vines are yielding an average of eight tons per acre, is now the second largest producer of grapes in the country. Wine making is expanding in Wedza and Salisbury.

Other Fruits

There has been an increased acreage planted to strawberries for commercial production; an average yield of about four tons per acre has been attained, with isolated yields as high as nine tons per acre. Two growers in the Matabeleland province planted 75 acres of strawberries, one of whom is successfully processing and marketing the yield from 70 acres as jam.

Nut Crops

Increased interest is being shown in the growing of Macadamia and Pecan nuts.

Vegetables

A marked increase in the production of vegetables has resulted in rather low prices being paid on the markets. There has been a definite expansion in the production of both fresh and canned peas. Severe frost in June, 1968 caused a shortage of vegetables until December. Some 500 acres of cucurbits were grown in the Limpopo area for export. Production of canning tomatoes at West Nicholson expanded and yields of up to 23 tons per acre were reported.

Tea

Increases in acreages planted by non-estate growers in the Chipinga area are reported and the crop grown under dry land conditions is making good progress; minor pluckings have been taken. Some 740 acres of privately grown tea are now on the ground. Land preparation and increased production continues by the two big tea growing companies and the use of irrigation has increased yields of green leaf to over 1,000 lb. per acre. Encouraging progress is being made in the Chipinga Purchase Areas where Tamandayi farmers have a 100 acre contract with a local estate, while farmers in Gwenzi and Chinyaduna have been offered 150 acres on contract.

Coffee

Interest in coffee continues to be shown by persons with small holdings in the Vumba and Chipinga areas. A section of the coffee settlement schemes in Chipinga was closed early this year but other growers in the area have had a moderately successful season. It is gratifying to note that a second mill is to be installed at Chipinga.

Fodder crops

A number of farmers in the higher rainfall areas are running fertilized pasture trials under the over-all supervision of the Department but the circumstances for their economic use have not yet been definitely established. Interest in fertilized pastures is increasing generally, and farmers in several areas have established fertilized pastures of their own accord, some of these, particularly in the lower rainfall areas, under irrigation. Generally, legume hay crops are less commonly grown that in the past, but pasture grasses have been planted on a slightly increased scale in Manicaland.

Maize continues to be grown at a static level for the production of silage which is the standard winter feed on dairy farms in most parts of the country. The tendency is now to make silage at a more mature stage of the crop, thus producing more total digestible nutrients per acre. There was an increase in the production of fodder crops for all classes of livestock in Manicaland and the acreage under lucerne increased. In some areas, fodder crop production is mainly confined to dairy and pig producers.

Other Crops

Other crops which are grown, mostly on a market garden scale, include green peppers, celery, seed tomatoes, canning tomatoes, pyrethrum and various flowers for seed. The latter seem to be fairly successful but at present are still being tested for climatic suitability.

LIVESTOCK

Beef Cattle

General

Despite satisfactory rains, summer gains were not as good as expected by most farmers—possibly due to lack of grass following the previous season's droughts and frost. Good late rains extended the season and most areas report cattle in good condition.

Supplementary feeding

Supplementary feeding is becoming more general in the Matabeleland and Victoria provinces, although levels are often too low. Over 80 per cent. of the breeding stock in some I.C.A.s are now being fed while it has been estimated that over 75 per cent. of the beef breeding stock received some form of supplementary feeding in Mashonaland.

Breeding

Despite the fact that most breeds respond to good husbandry there is still a tendency to try new "wonder" breeds, and uncontrolled cross-breeding, without adequate records, still occurs far too frequently. Nevertheless, the use of records is increasing.

Fattening

The prices paid for feeders still appear to be rather high and, in many instances, the trend has been away from high energy *ad lib* rations; whole maize plant feeding has diminished whilst reconstituted medium roughage rations are gaining popularity.

Fattening in African areas

It has been estimated that some 8,000 head of cattle are now being fattened in African areas, of which 3,600 are in the Victoria Province. One farmer in the Dewure Purchase Area has 60 head in his fattening pen at present.

Statistics of animal husbandry extension in the Purchase Areas are contained in Table 2 of Appendix IX.

Dairy production

The rush to enter the industry has eased and stock prices are stabilizing. Production from recorded herds has risen but yields from unrecorded herds remain far too low for satisfactory profitability. Efficient producers appear to be making a good margin.

Some larger producers in Matabeleland have tended to increase production, while there has been an over-all reduction of dairy stock numbers. Too much reliance is still being placed on unreliable dry land feed production.

Sheep

An increased number of farmers are keeping sheep for the first time and the industry is now at the stage where it is building up numbers of good quality ewes. Interest in dual purpose sheep is little changed from the previous year and a steady demand for advice on shearing, classing and marketing of wool continues. A course on

shearing and elementary classing was arranged by the Department for farmers and African shepherds.

The market demand for good quality lamb/mutton remains high. Although the wet summer was not ideal for sheep production, they nevertheless thrived with the late rains and the fairly warm winter. Some lamb deaths were caused by Rift Valley Fever.

Pigs

The situation has been relatively static with few new producers; management has remained efficient, especially amongst the larger producers. A substantial number of farmers produce pigs in Purchase Areas though management is generally of a low order.

Fish

The main contribution is fish from farm dams for ration purposes while an occasional query on the stocking of dams is raised. Licensed African fishermen on Lake Kyle appear to be making an adequate living.

Rabbits

These are mainly kept in African areas where Young Farmers' Clubs are active.

Beef Recording Scheme

Expansion in the past two years has been spectacular. Approximate figures are from 568 to 1,486 calf record sheets processed by officers of the Department and from 40 to 195 active members, although the proportion of active members is difficult to determine. Total membership increased from 158 to 225 during the past year.

It is significant that many of the country's stud and grade bull breeders are now joining the scheme, so that the use of performance records will play an increasingly important part in the production of the national seed stock. At an assumed average of 10 calves per record sheet, just under 15,000 calves were recorded during the past year.

Redesign of the scheme to incorporate computer processing with more accurate calculations for Rhodesian conditions, made satisfactory progress. The first phase of this exercise, weaner records, was completed and the first sets of computer printed records were returned to breeders. The redesign exercise is made possible by the close collaboration of the Chief Biometricians of the Department of Research and Specialist Services. At the same time as providing a more sophisticated scheme technically, it has been possible to simplify the work done, both by the farmer and field staff of Conex. Participants are reported enthusiastic about the scheme, and are encouraging fellow farmers to enrol.

Bull Approval Scheme

The second season of operation of this scheme was fairly successful. Showing some expansion over the first year, it is apparent that a number of breed societies have not adopted the scheme wholeheartedly and, in any case, have not put it into practice fully; the Hereford and Sussex Societies were most active. Thirty-two inspections were made by officers of the Department. There is, as yet, little evidence that bull performance results significantly affected the sale price of bulls, although it is encouraging that several breeders catalogued or displayed performance records at bull sales.

The scheme has undoubtedly encouraged a number of breeders to enter the Beef Recording Scheme.

The Livestock Improvement Committee

The Committee continued its work dealing with export and import of livestock. Liaison continued with the Rhodesia Registered Cattle Breeds Council and a representative of this body was appointed to the Committee.

Details of imports and exports are given in Appendices IIIA and IIIB, respectively.

CONCLUSIONS

The long persistent rumours of the eventual transfer of responsibilities in the Tribal Areas to the Ministry of Internal Affairs has had an unsettling effect on staff and farmers. Rumours that responsibility for the Purchase Areas are also to be transferred has raised the query among personnel and African farmers of "what next, and when?" Assurances of there being little likelihood of this taking place have done little to dispel the fear, previous such assurances having had little meaning in the final analysis.

Although the past season was generally good, farm profitability remains a constant cause for concern. Cotton, which was adopted as a substitute for tobacco in terms of cash cropping, has

presented additional problems and many farmers in the granite sandveld areas are seeking alternative solutions. The lack of adequate acreages of arable land on comparatively small farms established on a tobacco economy precludes the expansion of crop production on a sustained economic basis. The only possible solution on these farms points to maximum efficiency of production per unit/area.

While irrigation can help to alleviate the situation, farmers must exercise every care to evaluate the economics of schemes carefully, in relation to the increase in yields that could be expected over and above those they could expect under rainfall conditions and efficient production systems and methods. Irrigation development could go a long way towards stabilizing the farming industry, provided such development is primarily designed to supplement rainfall and not replace it, and thus synchronize the use of stored water with rainfall. To irrigate for irrigation's sake can be very costly.

The past favourable seasons has highlighted weaknesses in the protection of arable lands; both mechanically and biologically. A large number of farmers fail to construct works of adequate standard capable of withstanding the run-off that can be expected in a more favourable season. By way of compensation for the loss of income attributable to the present tobacco situation, larger acreages of alternative crops have been grown to maintain gross incomes. This has been achieved by a large-scale abandonment of crop rotations and ley pastures, resulting in the exploitation of land in excess of its inherent capabilities. Continuation of these practices can lead to eventual disaster.

The interest aroused in veld management and utilization some three years ago has continued unabated, and is no longer a transient phenonomen; it has developed into deep-seated concern for the state of the veld, with positive action being taken to remedy a situation now recognized as being one in the process of deterioration. Excellent progress has been made in assisting farmers with the planning and development of sound systems of veld management and utilization.

In the light of the significance and impact of correct veld management and utilization on soil and water conservation—coupled with sustained and increased livestock production—a long-term programme must be embarked upon which is sufficiently attractive to promote the construction of stock watering points, and the provision of paddocks with a view to establishing facilities for the implementation of correct veld management and utilization.

Progress in the Purchase Areas is steady, but many farmers are not making the best use of their farms; this is due to various problems, the majority of which lie within their own ability to overcome.

I would like to acknowledge, with thanks, the collaboration and help we have received from other departments and ministries with whom we work and, in particular, I am especially appreciative of the co-operation we have had in working with these bodies which are outside of Government—intensive conservation area committees, farmers' associations, the Rhodesia National Farmers' Union and many others.

To my own staff I would like to pay tribute and record my sincere appreciation of their loyal support and devotion to duty during the past year.

J. H. H. LOUWRENS,
Director of Conservation and Extension.

VISITS TO OTHER COUNTRIES

Miss P. Papadopoulo, Senior Apiculturist, visited apiaries and similar establishments in Thessalonika, Crete and near Athens. She attended the first South African Beekeeping Congress at Pretoria in April and the International Beekeeping Congress in Munich, Germany, in August.

Mr. J. W. Hayward, Chief Husbandry Officer, attended a conference of the South African Institute for Agricultural Extension at Bloemfontein in August.

Mr. A. T. Stubbs, Senior Animal and Pasture Specialist, attended a Conference of the South African Society of Animal Production in April.

Mr. W. R. Robertson, Senior Agronomist, visited various university agricultural departments in the Republic of South Africa.

Messrs. P. Ivy, Senior Planning Officer, J. M. B. Smith, Regional Conservation and Extension Officer, J. C. R. Hill, Pasture Specialist, and D. M. Gammon, Animal and Pasture Specialist, visited the Republic of South Africa during April to study veld management developments.

Mr. A. J. B. Hughes, Senior Extension Research Officer, undertook a brief study tour of Swaziland during March. The main purpose of his visit was to study agrarian problems and developments.

Mr. Duncan, Senior Farm Management Extension Officer, visited Malawi for a week in February at the invitation of the Tobacco Growers' Association. He visited 11 growers and discussed methods of handling tobacco. Mr. Duncan also visited South Africa in March, with Mr. Robertson (Senior Agronomist) on a study tour concerned with farm management. He visited the Division of Agricultural Production Economics in Pretoria, and the Professors of agricultural economics at the universities of Pretoria, Natal and Stellenbosch.

Mr. T. Kille, Acting Senior Tobacco Officer, attended the 17th International Course on Rural Extension at Wageningen in the Netherlands during July.

Mr. D. J. Donkin, Animal and Pasture Specialist, attended a course on dual purpose sheep at Dohne in South Africa.

PUBLICATIONS

Author	*Title*	*Publication*
Barclay-Smith, R.	Hints to help growers run a viable enterprise	*Rhodesian Tobacco Journal*
Barclay-Smith, R.	Lessons from the past season	*Rhodesian Tobacco Journal*
Barclay-Smith, R.	Observations on the season in Lomagundi	*Rhodesian Tobacco Journal*
Barclay-Smith, R.	Ways to increase revenue	*Rhodesian Tobacco Journal*
Barclay-Smith, R.	Lomagundi—land of contrast with the past	*Tobacco Forum of Rhodesia*
Barnes, F. B.	Observations on delayed foliation in apples	*Rhodesian Farmer*
Bromley, K.	The Headlands people	*Modern Farming*
Beaumont, C. and Naudé, F.	Report—post-graduate course in extension	Departmental
Collett, W. E.	When groundnuts should be lifted	*Rhodesian Farmer*
Collett, W. E.	Winning soyabean crop yields 20 bags per acre	*Rhodesian Farmer*
Collett, W. E. and Tattersfield, J. R.	Purple Seed Stain Survey in soyabeans, 1969	*Rhodesian Farmer*
Collett, W. E. and Tattersfield, J. R.	Recent developments in soyabean production	*Rhodesian Farmer*
Cormack, J. M.	Maintenance of earth dams	Rhodesian Farmers' Diary, 1970
de Jong, J.	Another look at cotton reaping	*Rhodesian Tobacco Journal*
de Jong, J.	Coffee Harvesting	*Rhodesian Farmer*
de Jong, J.	Cotton management	*Rhodesian Tobacco Journal*
Donkin, D. J.	Review: Sheep fertility A.B.A.	*Rhodesia Agricultural Journel*
Donkin, D. J.	Beef Recording Scheme Part I	*Rhodesian Tobacco Journal*
Donkin, D. J.	Beef: Supplementary feeding	*Rhodesian Tobacco Journal*
Donkin, D. J.	Breeds of sheep in Rhodesia Parts I and II	*Rhodesian Tobacco Journal*
Donkin, D. J.	Goats	*Rhodesian Tobacco Journal*
Donkin, D. J.	R.R.C.B.C. Bull approval scheme	*Rhodesian Tobacco Journal*
Donkin, D. J.	Sheep breeding seasons	*Rhodesian Tobacco Journal*
Donkin, D. J.	Sheep feeding—Dorper Field Day	*Modern Farming*
Donkin, D. J.	Sheep feeds on tobacco farms	*Rhodesian Tobacco Journal*
Donkin, D. J.	Sheep recording	*Rhodesian Tobacco Journal*
Donkin, D. J.	Sheep routine management	*Rhodesian Tobacco Journal*
*du Toit, F. J.	Drying groundnuts artificially	Departmental
Ellis, H.	Where ignorance is bliss—some misconceptions about herbicides	*Rhodesian Farmer*
Elwell, H. A.	An appraisal of the use of pasture furrows	Departmental
Elwell, H. A.	Mechanical conservation in perspective	Departmental
Elwell, H. A.	Reduced availability of water supplies	Departmental
Elwell, H. A.	The use of the handbook to achieve flexibility in the design of contour layouts in tribal and farming areas	Departmental
Gammon, D. M.	Some economic aspects of veld management systems	*Modern Farming*
Gammon, D. M.	Veld fire control	*Modern Farming*
Gammon, D. M.	Veld management principles	*Modern Farming*
Going, W. D.	Macadamia production	Departmental
Going, W. D.	The Pecan nut	Departmental
Haines, D. and McCormick, D.	Why drop flue-cured tobacco in Victoria province?	*Modern Farming*
Hill, J. C. R.	Veld management systems	*Modern Farming*
Howden, R. H. G.	The cultivation of soyabeans	*Rhodesian Tobacco Journal*
Howden, R. H. G.	Results of field trials 1966-67 and 1967-68	Departmental
Howden, R. H. G.	Rice growing in Rhodesia	*Tobacco Forum of Rhodesia*
Howden, R. H. G.	Sunflowers	*Rhodesian Tobacco Journal*
Hughes, A. J. B.	Some human problems of tribal area development	Commercial and Industrial Development (Salisbury)
Ivy, P.	A preliminary report on the Conex bush control demonstration plots	Paper presented at the Veld Management Conference
Ivy, P.	Erosion in the grazing areas	Paper presented at the "Soil Balance Symposium" at the University College of Rhodesia
Ivy, P.	Veld condition assessments	*Modern Farming*
Johnson, P. H. S.	A preliminary note on the soils of the Tsungwesi I.C.A.	Departmental

Author	*Title*	*Publication*
Jones, M. E.	Brief details of machinery which can be used for the threshing of soya beans	*Rhodesian Farmer*
Jones, M. E.	Contour construction using a disc plough and grader blade Parts I and II	*Rhodesian Tobacco Journal*
Jones, M. E.	Grain sugars and suitable prime movers .	*Modern Farming*
*Jones, M. E.	Groundnut threshing machines	Departmental
Jones, M. E.	Shelling of groundnuts for minimum breakages	*Modern Farming*
Jones, M. E.	Tobacco duster report	Confidential report to Tobacco Research Board
Jones, M. E.	Wasting your dust	*Rhodesian Tobacco Journal*
Jones, M. E.	Series of "Inventions and good ideas" . . .	*Modern Farming*
Keech, M. A.	Mondoro Tribal Trust Land patterns of development	*Rhodesia Agricultural Journal*
Keech, M. A.	Geography of soil erosion in Rhodesia . .	Paper presented at "Soil Balance Symposium" at University College of Rhodesia
Kille, T.	Burley tobacco in Rhodesia	*Tobacco—New York*
Kille, T.	Desirable Styles of Burley	*Rhodesian Tobacco Journal*
Kille, T.	Early action can counter White mould . .	*Modern Farming*
Kille, T.	Grading mistakes seen on the Floors this season	*Rhodesian Tobacco Journal*
Kille, T.	Hints on tobacco grading	*Rhodesian Tobacco Journal*
Kille, T.	Review of the burley industry	*Tobacco Forum of Rhodesia*
Locke, R. F.	A glance at some of the better known methods of applying insecticides on cotton plants	*Rhodesian Farmer*
Locke, R. F.	Results of preliminary trials with mist blowers	*Rhodesian Farmer*
*McFadden, E. J.	Survey of the mechanized aspects of groundnut production	*Rhodesian Farmer*
Metcalfe, C. B.	A look at Rhodesian farm sales in 1968 . .	American Society of Rural Appraisers
Midgley, D. and Stead, P. R. S.	Planning for profit	*Modern Farming*
Milligan, G.	Care of tobacco seedlings	*Rhodesian Tobacco Journal*
Milligan, G.	Leaf miner—a major problem	*Rhodesian Tobacco Journal*
Mitchell, R. J.	A guide to air photo interpretation for land use planners	Departmental
Oliver, G.	National ploughing match	*Rhodesian Tobacco Journal*
Oliver, G.	Preventive Maintenance	*Rhodesian Tobacco Journal*
Oliver, G.	The Conex Farm Machinery Training Centre, Domboshawa	The Rhodesian Farmers' Diary, 1970
Papadopoulo, P. (Miss)	Diseases of larval bees	*The Bee Line*
Papadopoulo, P. (Miss)	Diseases of larval bees (cont.)	*The Bee Line*
Papadopoulo, P. (Miss)	Pamphlets on preparation of show exhibits .	Departmental
Papadopoulo, P. (Miss)	Diseases of adult bees	*The Bee Line*
Papadopoulo, P. (Miss)	Nosema	*The Bee Line*
Papadopoulo, P. (Miss)	Paralysis	*The Bee Line*
Papadopoulo, P. (Miss)	Conclusions on articles	*The Bee Line*
Papadopoulo, P. (Miss)	Rhodesia, her bees and beekeepers	*Apiacta. International Magazine*
	Preparation for Winter	Departmental
Papadopoulo, P. (Miss)	Bees and agriculture paper for the first South African Congress on beekeeping	Departmental
Papadopoulo, P. (Miss)	Pure honey	Review of pamphlets
Papadopoulo, P. (Miss)	Introduction of foreign queens to *adansonii* colonies. Paper for the XXII International Congress (translated into four languages)	Apiacta
Papadopoulo, P. (Miss)	Rondavel beehouse	Departmental
Papadopoulo, P. (Miss)	Report on official tours in Greece.	Departmental
Papadopoulo, P. (Miss)	Report on the XXII International Congress of Apimondia	Departmental
Papadopoulo, P. (Miss)	Special report on the above Congress at the request of the Ministry of Internal Affairs.	Departmental
Papadopoulo, P. (Miss)	Beekeeping techniques. *The Bee World.* International scientific magazine of the Bee Research Association (London) at the special request of its Director, Dr. Eva Crane	
Pattulo, I.	Work study aspects of soyabeans production	Departmental
Ramsay, M.	Umvukwes transformation	*Tobacco Forum of Rhodesia*
Reynolds, S. F.	Marking boundary lines in hilly country . .	*Rhodesian Farmer*

Author	*Title*	*Publication*
Robertson, W. R.	Cotton rotations on sandveld	*Rhodesia Agricultural Journal*
Robertson, W. R.	Slow growth in maize and cotton	*Rhodesian Farmer*
Robertson, W. R.	Temporary storage of seed cotton	*Rhodesian Farmer*
Robertson, W. R.	The case for crop rotations	*Rhodesian Farmer*
Robertson, W. R.	The need for liming	*Rhodesian Farmer*
Spear, J.	Ploughing for minimum tillage	Ploughing Association of Rhodesia—National Championship, 1969
Spear, J.	The W.P.O. Tillage Symposium in retrospect	Ploughing Association of Rhodesia—Handbook
*Stead, P. R. S.	Groundnut drying trials, 1968	*Rhodesia Agricultural Journal*
Stocks, J.	Is it vital I fill my quota?	*Rhodesian Tobacco Journal*
Stocks, J.	Overcoming the effects of unfavourable weather	*Rhodesian Tobacco Journal*
Stocks, J.	Report of a study tour of the U.S.A., Switzerland and Italy	Departmental
Stubbs, A. T.	Manual of the Beef Recording Scheme	Departmental
Stubbs, A. T.	Report of a brief study tour of Canada and U.S.A.	Departmental
Turnbull-Kemp, P. (Mrs.)	An introduction to preservation	*Rhodesia Agricultural Journal*
Turnbull-Kemp, P. (Mrs.)	Home industry section of agricultural shows	*Rhodesia Agricultural Journal*
Turnbull-Kemp, P. (Mrs.)	Get the best use out of vegetables	*Kunzwa*
Turnbull-Kemp, P. (Mrs.)	How to cook	Departmental
Turnbull-Kemp, P. (Mrs.)	How to prepare a cookery demonstration	Departmental
Turnbull-Kemp, P. (Mrs.)	Jam making	Departmental
Turnbull-Kemp, P. (Mrs.)	Kugadzira Jamu	Departmental
Turnbull-Kemp, P. (Mrs.)	Mai Chenjerayi vanotiudza nezverirwo	Departmental
Turnbull-Kemp, P. (Mrs.)	Matamati	Departmental
Turnbull-Kemp, P. (Mrs.)	Some ideas on jam making	*Kunzwa*
Turnbull-Kemp, P. (Mrs.)	Various recipes and information sheets for the National Federation of Women's Institutes, Homecraft Magazine, Freedom from Hunger Campaign Newsletter, and the Young Farmers' and Natural Resources Clubs	*Kunzwa*
Wilson, B. B.	Deciduous fruit: Picking and packing for the national market	Departmental
Wilson, B. B.	Factory fruit acceptance standards	Departmental
Wilson, B. B.	Transport of dessert fruit	Departmental
Irrigation Branch	Staff prepared 29 papers for distribution at seminars, symposia and field days, and for inclusion in the Irrigation Training Handbook	Departmental
Planning Branch	Melsetter Regional Plan	Departmental
Planning Branch	Management Planning Pocketbook	Departmental
	*These four articles were combined in the Report of the Groundnut Production Investigation Committee	Departmental

RADIO BROADCASTS

Carew, G. W.	Sheep production	Ten minutes.
Donkin, D. J.	Sheep and wool	Four minutes.
Hill, J. C. R.	Veld Management	Fifteen minutes.
Mandisodza, T. K.	Agriculture for Africans	Thirty-nine half-hour programmes.
Mpofu, J.	Agriculture for Africans	Thirty-nine half-hour programmes.
Stubbs, A. T.	Beef Recording Scheme	Fifteen minutes.

APPENDIX III A

IMPORTATIONS APPROVED BY COMMITTEE

"A" Cattle

Breed	*Bulls*	*Cows*	*Calves*	*Heifers*
Aberdeen Angus	1	—	—	—
Afrikander	22	—	—	—
Bonsmara	15	—	—	40
Brown Swiss	2	8	—	—
Brahman	18	6	—	—
Charolais	2	52	—	—
Hereford	51	13	8	—
Shorthorn	7	10	1	—
Simmentaler	15	89	5	—
Sussex	10	13	—	—
Friesland	6	13	—	—
Jersey	1	5	—	—
Dexter	2	—	—	2

"B" Smallstock

Sheep	*Rams*	*Ewes*	*Lambs*
Corriedale	2	85	—
Dorper	18	38	—
Dohne Merino	4	70	—
German Merino	28	354	—
Hampshire Down	2	—	—
Letelle	1	—	—
Suffolk	1	15	—
Schleis Milch Sheep	1	9	—

Goats	*Rams*	*Ewes*	*Lambs*
Boergoats	15	49	—
Angora	1	75	75
Saanen	1	2	—
Jordaan	2	2	—

Pigs	*Males*	*Females*
Large White	1	2
Landrace	1	6

APPENDIX III B

EXPORTS OF CATTLE

Breed	*Males*	*Females*	*Calves*
Aberdeen Angus	4	—	—
Afrikander	68	307	1
Brahman	46	73	—
Charolais	1	—	—
Friesland	4	1	—
Hereford	4	15	—
Jersey	4	15	7
Simmentaler	2	—	—
Sussex	3	—	—
Cross Breeds	42	8	—
TOTALS	178	419	8

TRAINING

COURSES RUN AT TRAINING INSTITUTES

Institute	Number of courses held	Training/Trainee days	Participants	
			Conex staff	Others
Alvord	93	7,237	516	2,453
Domboshawa	66	6,000	467	1,343
Kayisa	35	3,658	157	748
Rowa	19	2,077	119	358
TOTALS	213	18,972	1,259	4,902

COURSES ORGANIZED AT DISTRICT AND PROVINCIAL VENUES

Province	*No. of courses*	*Attendance*
Mashonaland North	32	336
Mashonaland South	3	58
Manicaland	27	415
Midlands	14	169
Matabeleland	18	772
Victoria	68	878 plus T.L. authorities

The following are some of the subjects dealt with:

Extension, conservation, grazing management, ox and tractor ploughing, agronomy, animal husbandry, rabbits, poultry, gardening, bees, tobacco, pegging, Young Farmers' Clubs, irrigation, fertilizers, cotton, grain grading and women's clubs subjects.

SOIL CONSERVATION

Province	Period	Contour ridges and storm drains			Waterways pegged (miles)	Roads pegged (miles)
		Miles		Acres protected (estimated)		
		Pegged	Constructed (estimated)			
Mashonaland South	1968–69	1,073	986	20,751	19	32
	1967–68	5,483	1,223	25,751	272	362
Mashonaland North	1968–69	4,089	3,686	67,691	46	58
	1967–68	9,030	5,866	102,825	652	571
Midlands	1968–69	275	254	4,295	—	25
	1967–68	9,182	8,831	7,123	114	87
Matabeleland	1968–69	373	104	6,683	16	16
	1967–68	759	431	17,316	540	33
Manicaland	1968–69	730	708	9,344	49	8
	1967–68	1,171	1,002	12,782	76	32
Victoria	1968–69	308	306	3,804	42	—
	1967–68	6,163	3,517	38,846	519	—
TOTALS	1968–69	6,848	6,044	112,568	172	139
	1967–68	31,743	20,870	204,643	2,173	1,085

TRIBAL TRUST LANDS—OCTOBER, 1968 TO JUNE, 1969 INCLUSIVE

Province	Period	Contour ridges and storm drains			Waterways pegged (miles)	Roads pegged (miles)
		Miles		Acres protected (estimated)		
		Pegged	Constructed (estimated)			
Mashonaland South	1968–69	3,054	—	7,151	72	280
Mashonaland North	1968–69	1,288	—	16,468	259	80
Midlands	1968–69	79	79	2,237	—	6
Matabeleland	1968–69	313	126	16,146	17	3
Manicaland	1968–69	981	—	7,788	—	—
Victoria	1968–69	3,541	2,722	40,446	579	—
TOTALS	1968–69	9,256	2,927	90,236	927	369

N.B.—For 1968–69 the figures in the first table above are for farming areas only but the figures for 1967–68 are for both farming and tribal areas.

WATER CONSERVATION

Province	Period	Number of dams constructed	Capacity in million gallons	
			Total	Average
Mashonaland South	1968–69	75	895·8	11·9
	1967–68	78	1,131·8	14·5
Mashonaland North	1968–69	165	928·0	5·6
	1967–68	139	844·6	6·1
Midlands	1968–69	41	1,048·4	25·6
	1967–68	60	1,240·8	20·7
Matabeleland	1968–69	27	1,211·8	44·9
	1967–68	64	4,295·2	67·1
Manicaland	1968–69	68	433·5	6·4
	1967–68	137	197·0	1·4
Victoria	1968–69	18	34·3	1·9
	1967–68	60	37·0	0·6
TOTALS	1968–69	394	4,551·8	11·5
	1967–68	538	7,746·4	14·4

TRIBAL TRUST LANDS

Province	Period	Number of dams constructed	Capacity in million gallons	
			Total	Average
Mashonaland South	1968–69	3	13·0	4·3
Mashonaland North	1968–69	22	49·3	2·2
Midlands	1968–69	10	40·0	4·0
Matabeleland	1968–69	2	13·5	6·8
Manicaland	1968–69	4	1·6	0·4
Victoria	1968–69	2	28·9	14·5
TOTALS	1968–69	43	146·3	3·4

N.B.—For 1968–69 the figures in the first table above are for farming areas only but the figures for 1967–68 are for both farming areas and tribal trust lands.

DAMS CONSTRUCTED

Province	Year	Farmers and contractors				Government units	
		Earth dams		Weirs		Earth dams	
		Number	Percentage	Number	Percentage	Number	Percentage
Mashonaland South	1968–69	50	67	13	17	12	16
	1967–68	45	58	13	16	20	26
Mashonaland North	1968–69	36	22	34	21	95	57
	1967–68	23	17	5	4	111	79
Midlands	1968–69	17	41	4	10	20	49
	1967–68	39	65	1	2	20	33
Matabeleland	1968–69	18	67	7	26	2	8
	1967–68	32	50	28	44	4	6
Manicaland	1968–69	54	79	12	18	2	3
	1967–68	120	88	17	12	—	—
Victoria	1968–69	15	83	3	17	—	—
	1967–68	55	92	5	8	—	—
TOTALS	1968–69	190	48	73	18	131	34
	1967–68	314	58	69	13	155	29

TRIBAL TRUST LANDS

Province	Year	Farmers and contractors				Government units	
		Earth dams		Weirs		Earth dams	
		Number	Percentage	Number	Percentage	Number	Percentage
Mashonaland South	1968–69	2	67	1	33	—	—
Mashonaland North	1968–69	4	18	—	—	18	82
Midlands	1968–69	3	30	—	—	7	70
Matabeleland	1968–69	1	25	1	25	2	50
Manicaland	1968–69	4	100	—	—	—	—
Victoria	1968–69	2	100	—	—	—	—
TOTALS	1968–69	16	36	2	4	27	60

N.B.—For 1968–69 the figures in the first table above are for farming areas only but the figures for 1967–68 are for both farming and tribal areas.

APPENDIX VIII

CRITICAL FIELD TRIALS CONDUCTED BY THE DEPARTMENT DURING 1968–69

Type of trial	Manica-land	Mashona-land North	Mashona-land South	Matabele-land	Midlands	Victoria	Total
Maize variety	1	—	—	—	—	1	2
Maize fertility	—	—	—	—	—	1	1
Cotton variety	—	1	1	—	—	1	3
Cotton fertilizer/spacing	—	1	—	—	—	—	1
Grain sorghum variety	—	1	—	—	—	1	2
Lime and fertility	—	—	1	—	—	—	1
Fruit fertilizer	1	—	—	—	—	—	1
Fruit spraying	1	—	—	—	—	—	1
Bush control	3	6	—	—	—	2	11
TOTALS	6	9	2	—	—	6	23

APPENDIX IX

TABLE 1

RECORD OF GENERAL EXTENSION WORK

PURCHASE AREAS

Province	Mashona-land North	Mashona-land South	Matabele-land	Midlands	Victoria	Manica-land	Total
Number of master farmers	1,261	894	118	895	5,807	805	9,780
Number of master farmers qualifying during the year	26	35	—	—	33	37	131
Number of master farmers in training	133	268	11	25	1,655	281	1,373
Number of co-operative farmers	980	536	872	416	33,336	1,234	37,374
Number of farm carts in use	1,603	1,085	577	1,176	7,349	1,183	12,973
Number of farmers using fertilizer	1,215	1,125	157	450	2,620	947	6,514
Number of farmer days	97	94	46	149	1,082	230	1,698
Number of farmers attending field days	7,232	3,933	547	4,461	39,229	4,551	59,953
Number of agricultural shows	4	4	—	3	12	13	36
Number of training courses in use	21	11	—	3	127	14	176
Number of training centres constructed during the year	—	—	—	—	3	—	3
Number of tractors	131	91	25	32	76	70	425

TABLE 2

ANIMAL HUSBANDRY EXTENSION

PURCHASE AREAS

Province	Supplementary feeding		Pen-feeding					Number of farmers marketing through C.S.C., Colcom			Number of farmers dosing	
	Number making hay	Number making silage	Total cattle in pens	Grade obtained								
				C.I	C.II	C.III	G.A.Q.	Cattle	Sheep	Pigs	Cattle	Sheep
Mashonaland North	226	1	321	—	2	—	83	207	—	3	165	10
Mashonaland South	141	—	540	—	2	15	124	348	—	24	315	95
Matabeleland	13	3	45	—	1	10	22	40	4	40	47	46
Midlands	188	20	121	—	—	—	82	472	75	10	598	267
Victoria	321	14	779	8	8	60	455	451	15	28	803	607
Manicaland	393	25	736	5	20	75	508	650	34	140	399	119
TOTALS	1,282	63	2,542	13	33	160	1,274	2,168	128	245	2,327	1,144

TABLE 3

PURCHASE AREA EXTENSION

Province	Total acreage	Total number of farms alienated	Number of I.C.A.s	Number of farmers' associations	Number of farm plans prepared
Mashonaland North	368,877	1,370	14	4	17
Mashonaland South	362,986	1,239	14	8	1
Matabeleland	349,856	810	4	7	74
Midlands*	592,966	1,362	16	11	3
Victoria	671,850	2,003	21	12	17
Manicaland	290,963	1,454	14	13	23
TOTALS	2,637,498	8,238	83	55	135

* Includes Chemagora U.R.L.

ANALYSIS OF HOUR UTILIZATION BY EUROPEAN STAFF

Province	Victoria		Mashonaland North		Mashonaland South		Midlands		Matabeleland		Manicaland		Grand total	Percentage
	Total	Percentage	Total	Percentage	Total	Percentage	Total	Percentage	Total	Percentage	Total	Percentage		
I.C.A. group farmers	1,703	6·5	2,519	5·0	2,137	7·0	1,258	5·5	1,305	5·3	2,013	6·8	10,935	5·9
Staff conferences	1,550	5·9	1,936	3·8	643	2·1	877	3·8	877	3·5	1,016	3·4	6,899	3·7
Courses	2,168	8·2	2,978	5·9	1,545	5·1	1,513	6·6	1,158	4·7	2,139	7·3	11,501	6·2
Inspections	689	2·6	2,066	4·0	1,572	5·1	888	3·8	816	3·4	1,210	4·1	7,231	3·9
Agronomy	2,125	8·0	3,395	6·7	2,958	9·2	1,267	5·5	783	3·2	3,520	12·0	14,048	7·6
Tobacco	128	0·5	1,014	2·0	551	1·8	333	1·4	9	—	844	2·9	2,879	1·6
Livestock	1,894	7·2	3,346	6·7	3,085	10·1	2,691	11·6	2,824	11·5	2,185	7·4	16,025	8·7
Soil/water conservation	1,758	6·7	11,539	22·7	4,832	15·8	2,405	10·4	1,693	6·9	4,040	13·6	26,267	14·3
Irrigation	2,422	9·2	971	1·9	1,533	5·0	1,973	8·5	2,192	8·9	2,021	6·7	11,112	6·0
Farm planning	2,227	8·4	1,661	3·3	1,128	3·7	2,147	9·2	1,742	7·1	1,119	3·7	10,024	5·4
Farm management	569	2·3	533	1·0	532	1·7	416	1·8	501	2·0	332	1·1	2,883	1·6
Field-days, shows	884	3·4	2,196	4·9	1,794	5·9	643	2·8	1,039	4·2	1,227	4·1	7,783	4·2
Field trials	437	1·7	740	1·4	281	0·9	363	1·6	680	2·8	618	2·1	3,119	1·7
Census	384	1·5	687	1·3	141	0·5	61	0·3	157	0·6	127	0·4	1,557	0·8
General extension liaison	1,887	7·2	3,822	7·6	1,880	6·2	2,022	8·7	1,394	5·6	2,561	8·7	13,576	7·3
Administration	5,492	20·6	10,625	20·9	5,589	18·2	4,147	17·9	7,110	0·7	4,059	13·9	37,022	20·1
Publications	21	—	465	0·9	364	1·2	140	0·6	415	1·6	516	1·8	1,926	1·0
TOTALS	26,343*	100	50,503*	100	30,565†	100	23,144†	100	24,695†	100	29,547†	100	184,797	100

* Includes tribal area hours up till 30th June, 1969.

† Travel time was included by these provinces as a separate return but is not included here. The inclusion of travel time would increase these provinces' total hours by ± 17 per cent.

MEETINGS ATTENDED BY CONEX STAFF

HEAD OFFICE STAFF

1. N.R.B. Resource Education Committee (C.T.O.).
2. N.R.B. General Purposes Committee (Assistant Director (Field)).
3. N.R.B. Wild Life Conservation Committee (Assistant Director (Field)).
4. N.R.B. Meetings (Director).
5. N.R.B. Tribal Trust Land Committees (Assistant Director (Field)).
6. N.R.B. Mineral Resources Committee (Assistant Director/Technical).
7. Y.F.C. Council (S.Y.E.O.).
8. Y.F.C. Executive Meeting (S.Y.E.O.).
9. Gwebi College Council (Director).
10. Chibero Agricultural College Council (Assistant Director (Field)).
11. Bilharzia Committee (Ministry of Health) (Assistant Director (Technical)).
12. Henderson Research Station. Farm Unit Committee (Assistant Director (Field)).
13. Agricultural Assistance Board (Assistant Director (Technical)).
14. Agricultural Diversification Scheme Central Committee (Director).
15. Central Committee F.I.F. (Assistant Director (Technical)).
16. Freedom From Hunger Campaign National Committee (Assistant Director (Field)).
17. Publicity Committee (Assistant Director (Technical)).
18. African Farmers' Liaison Committee with Ministry (Director/Assistant Director (Field)).
19. Rhodesian Agricultural Journal (Assistant Director (Technical)).
20. Rhodesian Oil Seed Producers' Association (Assistant Director (Technical)).
21. Hydrological Co-ordinating Committee.
22. Rhodesian Cotton Growers' Council (Assistant Director (Technical)).
23. Pasture Seeds and Horticultural Crops Committee.
24. R.N.F.U. Farm Management Committee.
25. Standing Committee on Farm Mechanization (Assistant Director (Technical)).
26. Ministry Show Committee (Assistant Director (Technical)).
27. Field Experiment Committee.
28. Livestock Improvement Committee (Director, Chairman).
29. S.A.R.C.C.U.S. (Director).
30. Mashona Cattle Society.
31. Tuli Cattle Society.
32. Tobacco Research Board (Director).
33. Tobacco Marketing Board.
34. Tobacco Seed Association Executive Committee.
35. Tobacco Seed Association Technical Committee.
36. The Burley Tobacco Growers' Association.
37. Oriental Tobacco Advisory Committee.
38. Rural Land Board (Director).
39. Rural Land Board Sub-division Committee.
40. Rural Land Board Sub-committee on Land Settlement (Director).
41. Water and Land Development Sub-committee of the Sabi-Lundi Authority.
42. Irrigation Co-ordinating Committee.
43. Standards Association of Central Africa—various working committees.
44. The Ploughing Association of Rhodesia.
45. World Ploughing Association Local Committee.
46. Community Development Training Committee (Domboshawa) (A/D(T)) (Observer).
47. Engineering Committee.
48. Soil Balance Committee of the University College of Rhodesia.
49. Crop Forecasting Committee of Controlled Products.
50. Fertilizer Advisory Committee.
51. The Working Party on the re-use of Sewage Effluent.
52. The Water Reservation Committee.
53. The Soil Survey Liaison Committee.
54. The Executive Committee of the Irrigation Association of Rhodesia (in unofficial capacity).
55. Cotton Liaison Committee.
56. Lowveld Liaison Committee.
57. Rhodesia Seed Potato Association.
58. Crop Variety Committee.
59. Soya Competition Judges' Committee.
60. Rhodesian Registered Cattle Breeders' Council.
61. Tengwe Working Party.
62. Beef Recording Planning Committee.
63. Veld Management Working Party.
64. Wild Life Commission.
65. Africander Cattle Club.
66. Short Duration Grazing Evaluation Team.
67. Veld Management Conference Planning Committee.
68. Sheep Planning Committee.
69. Wiltiper Breed Society.

70. The Library Committee.
71. Standing Committee on Agricultural Engineering.
72. Tillage Research Committee of the World Ploughing Organization.
73. Grain Research Liaison Committee.
74. Sub-committee on the use of wet lands—a sub-committee of the N.R.B.
75. Committee on the Co-ordination of Cloud Seeding Experiment (Assistant Director/Technical).

PROVINCIAL AND DISTRICT STAFF

Manicaland

1. Conservation Education Committee.
2. Y.F.C./N.R. Regional Committee.
3. Irrigation Co-ordinating Committee.
4. Drought Relief Committee.
5. Odzani and Umtali Irrigation Board.
6. Rhodes Inyanga Experiment Station Liaison Committee.
7. Chipinga Coffee Experiment Station Liaison Committee.
8. Deciduous Fruit Growers' Association.
9. Manicaland Agricultural Society.
10. Inyanga Show Society.
11. Provincial and District Conferences.
12. Farm Irrigation Fund Committee.
13. I.C.A. Committees.
14. R.N.F.U. Eastern Branch
15. Manicaland Branch of Ploughing Association.
16. Rural Industry Committee.

Midlands

1. Midlands Conservation Education Committee.
2. Provincial and District Conferences.
3. I.C.A. and Group Committees.
4. R.N.F.U. meetings.
5 Farm Irrigation Fund Committee
6. Y.F.C./N.R. committee.

Mashonaland North

1. Provincial Conference.
2. Irrigation Co-ordinating Committee.
3. Statistical Co-ordinating Committee.
4. Agricultural Assistance Board Technical Advisory Committee.
5. Farm Irrigation Fund, North East and North West Regional Committee.
6. Ploughing Association of Rhodesia.
7. Rural Land Board Sub-committee investigating Purchase Area activity.
8. Cotton Seed Selection Committee.
9. Wengi Proving Unit Management Committee.
10. Sub-committee of Natural Resources Board investigating Section 14 of Natural Resources Act.
11. I.C.A. Committees.
12. Farmers' Association meetings.

Mashonaland South

1. Farm Irrigation Fund.
2. Agricultural Assistance Board.
3. Drought Relief Committee.
4. Irrigation Co-ordinating Committee.
5. Salisbury Show, Produce Section.
6. Regional Young Farmers' Club.
7. Provincial and District Conferences.
8. Cattle Society.
9. Farmers' Associations.
10. Grasslands Research Station Liaison Committee.
11. I.C.A. Committees.

Victoria

1. Provincial and District Conference.
2. R.N.F.U.
3. I.C.As and Group I.C.A.s
4. Conservation Education Committee.
5. Provincial Council Conservation Committee.
6. Freedom from Hunger Committee.
7. Y.F./N.R. Clubs.
8. Cane Planters' Association.
9. Drought Relief.
10. Farm Irrigation Fund.
11. Research Liaison Committees.
12. A.F.U.
13. Irrigation Co-ordinating Committee.

Matabeleland

1. I.C.A. and Group I.C.A. Committees.
2. Farmers' Association and Road Council Meetings.
3. R.N.F.U. Executive Committee and Commodity Associations.
4. Matabeleland Development Council.
5. F.I.F.
6. Association of Scientific Societies of Rhodesia.
7. Bulawayo Agricultural Society.
8. N.R.B. Trophy Committee.
9. Conservation Education Committee.
10. Regional F.F.H.C. Committee.
11. Primary Development Committee.
12. Matopos Research Station Liaison Committee.
13. Provincial Irrigation Co-ordinating Committee.
14. Drought Relief Committee.
15. Matabeleland Rural Industries Committee.

In addition to the above meetings, Conex Officers at Head Office and in the Provinces, participate in various organizations such as Rotary, Lions, Round Table, M.O.T.H., Boy Scouts, etc.

APPROXIMATE ACREAGES IRRIGATED CROPS IN FARMING AREAS, 1968–69

Crop	Mashona-land North	Mashona-land South	Manica-land	Midlands	Victoria	Matabele-land	Total
Maize	1,639	5,850	2,780	5,464	3,287	6,102	25,122
Cotton	6,603	3,025	2,063	965	16,390	1,131	30,177
Groundnuts	85	50	—	—	260	315	710
Tobacco	86	1,455	155	25	23	—	1,744
Soyabeans	36	460	150	—	61	—	707
Other summer crops	582	1,020	155	90	1,200 (3)	446	3,493
Wheat	2,558	1,485	965	1,882	14,655	1,218	22,763
Barley	—	—	30	40	1,000	75	1,145
Potatoes	335	1,510	333	326	110	131	2,745
Other winter crops	64	1,405	2,115 (1)	165	792 (4)	1,049 (4)	5,590
Lucerne	322	955	537	468	35	1,696	4,013
Citrus	3,663	644	367	306	1,600	709	7,289
Deciduous fruits	190	370	1,125	94	—	38	1,817
Vines	36	272	150	50	4	145	657
Pastures	305	530	403	—	234	264	1,736
Sugar cane	—	—	—	—	45,000	—	45,000
Other perennial crops	150	385	4,053 (2)	—	—	82 (5)	4,670
TOTALS	16,654	19,416	15,381	9,875	84,651	13,401	159,378

(1) Mainly green peas. (2) Mainly coffee and tea. (3) Sorghum. (4) Mainly vegetables. (5) Mainly strawberries.

VELD MANAGEMENT

A. SYSTEMS PRESENTLY OPERATING (PLANNED BY CONEX)

Grazing system	*Number of farms operating system*		*Total acreage involved*	
	New plans	*Total*	*New plans*	*Total*
Split season system	80	80	776,152	776,152
Short duration grazing programme	346	346	3,104,470	3,104,470
GRAND TOTALS	426	426	3,880,622	3,880,622

B. POTENTIAL FOR EXPANSION

New applications not yet planned

Type of plan applied for	*Number of farms*	*Acreage involved*
Split season system	—	—
Short duration grazing	265	1,957,435
TOTALS	265	1,957,435

C. FARMER COURSES AND FIELD DAYS

Number of courses/ field days	*Attendance*
87	1,598

Annual Report of the Director of Veterinary Services

for the year ended 30th September, 1969

GENERAL

Following the severe drought of the 1967/68 season, grazing conditious in October and November were about as bad as they could be for livestock. Early rains in these two initial months however promised well for the coming season. Unfortunately in the middle of November heavy rain accompanied by extremely cold winds for several days decimated livestock in the southern half of Rhodesia. Day temperatures in some places dropped from over 100°F to the low forties in twenty-four hours. Recorded deaths amounted to 126,281 cattle and small stock losses were probably no less. Gwanda District a comparatively small one, reported 16,130 cattle, 32,344 sheep and goats, and 2,134 antelope deaths. In Victoria Province the following game carcases were counted: Kudu 418, Impala 1,162, Sable 22, Zebra 77, Giraffe 139, Buffalo 3, Duiker 848, Stembuck 318, Eland 21, Bushbuck 27, Reedbuck 37, Hartebeeste 33, Wildebeeste 2, Grysbok 2, Klipspringer 1, Nyala 2, Pig 2, Hippo 30, total 3,143 head.

After this disastrous spell the season settled down to above average rainfall interrupted only by a dry spell in February. Record maize and cotton crops were reaped and the grazing has been exceptionally good. The rainfall figures given below indicate the difference between a good and a bad season.

	Rainfall		
	1969	*1968*	*1967*
Gwanda	25.4	9.31	25.51
West Nicholson	21.64	6.12	24.74
Beitbridge	12.07	6.82	12.23
Victoria	26.0	9.9	32.63
Bikita	48.0	28.77	60.99
Nuanetsi	22.0	7.2	20.56
Zaka	32.0	17.3	34.49
Chipinga	40.3	23.15	50.0

Disease summary

An outbreak of Newcastle disease which was detected on the 19th of September, 1968, 11 days before the period under review commenced, was speedily eliminated without extension to any of the major poultry producers. The only other epidemic condition encountered was a severe occurrence of Rift Valley Fever. This condition was no doubt aggragavated by late rains and the highly susceptible state of our stock since the last appearance of this disease occured as long ago as 1958. The country has fortunately remained free from foot and mouth disease for two years in spite of active infection in neighbouring territories. Trypanosomiasis remains our major problem though considerable progress in tsetse fly control can also be reported. Positive blood smears dropped from 6,313 in the previous year to 5,356 in the present period. Deaths from theileriosis declined from 254 on 33 properties to 36 on 17 properties, and other tick-borne diseases continued at their normal low incidence. Anthrax recurred on three farms causing seven deaths in cattle. Confirmed cases of rabies decreased from 50 in 1968 to 32 in 1969.

STAFF

Professional officers

Our establishment of Veterinary Officers was increased from 40 to 46 posts with effect from 1.7.68. The staff position at the end of the year (30.9.69) was as follows:

	1964	*1965*	*1966*	*1967*	*1968*	*1969*
Establishment	40	40	40	40	46	46
Fixed Establishment	18	26	23	27	32	34
Provisional Transfer	7	5	4	2	1	—
Contract Appointments	4	3	6	4	2	3
Vacant Posts	11	6	7	7	11	9

The anticipated improvement was limited to an increase of only two officers because one bonded student repaid his indebtedness to Government and joined a commercial firm in the Republic of South Africa, and one was killed in a climbing accident. Three officers are due to join the Department in the immediate future. This increase will however, be offset by two resignations before the end of 1969. Some 27 Rhodesian students are due to qualify before 1972, of whom 12 are bonded to Government. The commencing salary for a graduate without experience is £1,728 per annum.

Animal Health Inspectors

The turn-over in this sector was above normal in that 19 officers in an authorized establishment of 106 left the Department. Of these, one retired after 34 years service, two terminated their provisional transfer from the former Federal Service, one transferred to another Department, 12 resigned and three were discharged. Prospects

were somewhat improved by the regrading of three senior posts, but further efforts in this respect are necessary to retain staff because only one officer is over 50 years of age. The excellent contribution made by this sector of the department to routine disease control cannot be over-stressed. These men work to the job, not the clock, irrespective of the unpleasant conditions encountered in inspecting masses of cattle in clouds of dust or pouring rain.

Training of animal health inspectors

This section has made great progress under the able leadership of Mr. H. S. de Bruijn. All recruits are given an intensive induction course for two weeks, prior to being posted to district offices for practical experience. A comprehensive handbook has been compiled and is issued to all inspectors. More advanced courses lasting one week are given to more senior staff in addition to the two-day sessions at provincial offices as and when routine work permits.

Twenty-five one-day courses were given to African dip attendants at dipping centres in the field and five two-day instructional courses to field orderlies, field assistants and primary development officers employed by the Ministry of Internal Affairs.

Demands on this section from appreciative District Commissioners have snow-balled to such an extent that we have had to second another senior inspector to assist.

Meat inspectors

The meat inspection staff now comprises three full-time Veterinary Officers and 25 qualified meat inspectors who undertake this service at the four abattoirs owned by the Cold Storage Commission. Colcom pig factory and Liebig's abattoir at West Nicholson.

For the second consecutive year a course for the R.S.H. Certificate in Meat Inspection was held in Bulawayo from January to August, 1969. Five Veterinary Department trainees, five C.S.C. personnel and one Bulawayo City Health Department trainee all completed the course and passed the final examination. The external examiners Dr. H. Thornton—a world authority on meat inspection, and Dr. L. W. van den Heever, Senior Lecturer, Veterinary Food Hygiene and Public Health, Onderstepoort, both commented on the high standard achieved.

Adequate staff are now on hand to service the new Cold Storage Commission abattoir being built at Gatooma and due to commence operations in July, 1970.

Tsetse control branch

During the year two glossinologists were appointed, but as there have been two resignatioons and one transfer, the staff situation has deteriorated.

The experience gained by the younger professional staff now enables them to plan control operations and to assess their effects with confidence. They are now able to instruct new professional recruits, but, unfortunately these are not forthcoming. It is becoming apparent that special inducements will be needed to attract young biologists to undertake the arduous but rewarding life of a field glossinologist. In order to maintain and improve the degree of control over the tsetse fly and trypanosomiasis that has been achieved, we must be assured of a steady flow of recruits. Too much is now being done by too few.

It is pleasing to report that a promise of relief for our difficulties in administration has been afforded by the provision of a further administrative officer post. However, it has not yet been filled.

Courses of instruction have been given to two candidates for the Senior Tsetse Field Officer examination and 12 Animal Health Inspectors.

Veterinary Research Branch

Our prime requirement in this branch is an experienced virologist to identify the causes of minor outbreaks of unknown origin, which would appear to be due to some infectious agent. These conditions seldom assume serious proportions but can cause considerable loss on a particular farm or even within an individual herd on a sector of the property. There is no doubt that the role of unsuspected viruses will assume an increasing importance as stock densities and intensive husbandry develop. Early identification of the aetiology of any outbreak is basic to efficient control. We are grateful to Onderstepoort and the recently established virology section of the University College of Rhodesia, but too much dependence on third parties is unsatisfactory. Our laboratory is also deficient of a parasitologist.

Office accommodation and housing

The decision to postpone erection of the new veterinary research laboratories at Hatcliffe for the foreseeable future is unfortunate but in present circumstances, not unrealistic. Provided the new virology block scheduled for 1970, is erected on our present site and other minor alterations are carried out, our diagnostic competence will be adequate.

A new building to accommodate the whole of the Tsetse Control Branch is confidently expected to be completed in the coming year, as are new field offices at Gatooma and Umvukwes.

The investigation laboratory at Bulawayo was completed in February, and now caters for most specimens from Matabeleland—a service that has been wanted for many years.

Staff housing in several of the smaller towns is still inadequate.

Livestock

Increases in all classes of livestock have again taken place this year in spite of losses from the November cold spell and previous drought. In the context of Africa, Rhodesia is singularly free from serious decimative and epidemic diseases. An occasional outbreak or wave of infection, such as Rift Valley Fever, is bound to occur, because, apart from that section of our frontier formed by Lake Kariba, we are open to invasions from neighbouring territories. These rare intrusions however, cause serious alarm among stock-owners even when the outbreak is limited to a small sector of the industry. The factual position is that losses from disease are minimal in relation to losses from poverty and poor management. Lack of veld management, negligence in respect of prophylactic vaccinations and failure to control internal and external parasites by intelligent and regular measures cause losses far outweighing those from specific disease. It is unfortunately difficult and frequently impossible, to convince owners that a few shillings per head, spent on anthelmintics and dip is a lot more economical than having to provide supplementary feed. Clean stock are more likely to be economical stock.

Beef cattle

Beef cattle continue to be the most stable and encouraging farming enterprise. The improvement in the quality of slaughter animals being received at C.S.C. abattoirs in recent years is most commendable. It reflects the variety and high standard of our pedigree herds, which produce the bulls to sire this type of beast. It is unfortunate that the African sector which still owns 53.4 per cent. of all cattle does not contribute proportionately to the numbers slaughtered annually. The reasons for this are numerous and complex, varying from the African's traditional outlook on cattle as a bank to the small size of individual herds which makes culling, as we know it, difficult.

Dairy cattle

The problem is over-production—the larger the percentage which has to be used for manufacturing, the more adversely is the price affected. This in turn leads to increased production to reduce costs per gallon. The trend of increased yields per cow from fewer and larger herds continues.

Sheep

Local production of mutton and lamb is continuing to expand rapidly. Domestic demand at current prices will probably be satisfied towards the end of 1970. Once production begins to exceed demand mutton and lamb producers will have to consider ways of expanding consumption—perhaps by advertising—but a downward adjustment of prices will probably be necessary. Although the *per capita* consumption at approximately 1½ lb. per annum is very low the market is relatively limited to the European sector because of the taste preference of Africans for beef and poultry. Also with chicken at 2s. 6d. per lb. and beef at less than 2s. there is no race.

Schistosomiasis poses the greatest threat to this industry until such time as economical curative measures are possible. Some very good pedigree and commercial flocks exist, but, too frequently, others are a neglected side line.

Goats

Goats—almost exclusively African-owned—form a useful source of protein to their owners. Numbers sent for slaughter to the main abattoirs doubled this year as compared with 1968.

Pigs

The standard of pigs bred by Europeans is very high and problems are almost exclusively concerned with management. The industry is faced with over production and various measures,

including a price reduction have been instituted to discourage new breeders. The position is not improved by an increasing supply from the African areas. At the Bulawayo C.S.C. abattoir 66 per cent. came from this sector, and 30 per cent. of the total slaughtering were from Africans.

The Veterinary Surgeon employed by the Pig Industry Board has done much to reduce losses from deaths in transit, and condemnations resulting from tail-biting. We continue to provide him with all necessary laboratory assistance.

Poultry

Here again, the foundation stock of large producers is of exceptionally high grade and in great demand by adjacent territories. The industry has weathered marketing problems with commendable resource and is geared for mass production when circumstances permit. High quality broilers at 2s. 6d. per lb. find their way on to most tables regularly.

The Newcastle disease outbreak in September, 1968, was speedily contained and eliminated within six weeks, and did not involve the premises of any major producer. Coccidiosis is the most troublesome condition.

Chinchillas

Chinchilla breeding is still somewhat of an infant industry, and beset by marketing and management problems. Listeriosis has been the most significant disease during the year.

Border control

Sabi-Limpopo Game Fence

The presence of this 109-mile fence of 10 strands of high strain steel wire 7 ft. 6 in. high is a most comforting thought when foot and mouth disease is reported on the other side. The fence is patrolled and maintained continuously by resident guards. African rustlers and smugglers have decided their activities are unrewarding, and no attempts to introduce cattle were detected this year. Even the elephants have concluded that the fence is there to stay, and damage was minimal.

Wankie and Kazungula game fences

These two 120 mile fences similar to the above were maintained in good condition despite severe and recurrent elephant pressure on certain sectors. They form formidable barriers between the Wankie National Park and Tjolotjo Tribal Trust Land, and between the northern part of Botswana and Matetsi area respectively.

Cattle fences

Cattle fences on those sectors of the border which are fenced were well maintained and prevented incidents and contact. On the unfenced sectors there was less straying than normal due to more plentiful grazing on both sides. Fort-six stray cattle and six sheep were confiscated and slaughtered, realizing £851 15s. 0d.

Quarantine Camps

Owing to the development of rail and road facilities in the Fort Victoria low veld it was necessary to establish a more conveniently situated quarantine camp on the Chiredzi River in place of Magudu. At this new centre 3,578 head of cattle were quarantined. A reduced scale of charges for imported animals detained for import tests was agreed to by Treasury and the department will again undertake redwater and gall-sickness immunization of imported animals at a flat rate of £15 per head.

Tick life and dipping

The number of quarantine orders for tick infestation fell slightly from 1,753 in 1968 to 1,670. There is no reason here, however, for satisfaction. The standard of tick control generally throughout the country has deteriorated markedly in the last 10 years. When it is considered that the present excellent position of the cattle industry is due in no small measure to rigorous tick control over the previous 60 years—including the elimination of East Coast Fever by 1954—the current complacency bodes ill for the future. The position is even more distressing because we now have many sophisticated and highly efficient dip preparations, which are capable of giving complete tick control under any circumstances if used intelligently and regularly.

The position is worst in the African areas and the most culpable are not the cattle owners themselves. The fault lies largely with those responsible for providing adequate water supplies at dipping centres and proper supervision of dip strengths. We accept the fact that the more expensive organic dips are often necessary, and that the annual dipping fee of 3s. per head is inadequate, but these are not reasons for failing to face the

problem. Five years ago the Department drew attention to the increasing costs of this service, and our proposals to take over the responsibility on a realistic budget were not accepted. As long as District Commissioners have to get the extra money necessary from a "common pocket", there will inevitably be a clash of priorities, for extra money spent on dipping will mean that much less for other projects.

Fortunately the picture is not uniformly sombre. Certain District Commissioners and their Field Assistants—notably Beitbridge—could not have a more efficient dipping service.

That it was necessary to issue 687 quarantine orders to European owners, who are regarded as leaders in the farming industry, is not to their credit.

Quarantine orders issued

	European-owned properties	*African areas*	*Total*
1968/69 . .	687	983	1,670
1967/68 . .	855	898	1,753
1966/67 . .	857	804	1,661

Contraventions	*Prosecutions*	*Total fines* £
Cattle Cleansing Regulations . .	959	2,560 11 0
Movement of Cattle	70	401 10 0
Rabies Regulations	391	1,693 0 0
Foot and Mouth	143	233 0 0
Trypanosomiasis Regulations .	74	276 0 0
Stock Register	21	19 0 0
Import Regulations	1	10 0 0
Animal Health Act	102	347 10 0
Cruelty to Animals	24	107 0 0
Total 1968/69 . .	1,785	5,647 11 0
1967/68 . .	1,601	5,922 17 3

It will be noted that more than half (959) of the 1,785 prosecutions were for infringements of the Cattle Cleansing Regulations.

Cattle inspected

District	*European*	*African*	*Total*
Salisbury . . .	1,604,961	1,606,088	3,211,049
Bulawayo . . .	1,045,877	3,611,467	4,657,344
Umtali	260,033	1,291,767	1,551,800
Gwelo	667,079	1,202,409	1,869,488
Victoria . . .	2,211,617	3,343,335	5,554,952
Sinoia	841,876	384,410	1,226,286
Gwanda . . .	770,778	1,977,071	2,747,849
Chipinga . . .	246,588	643,393	889,981
Total . .	7,648,809	14,059,940	21,708,749
1967/68 . . .	7,359,645	13,964,605	21,324,250

CATTLE SALES

European-owned cattle

The number of auction sales held increased from 409 in the previous year to 480 in 1969. Prices were well maintained and reflect the continued interest and expansion of beef production. The cost of bulls was lower and more realistic for those seeking sires for ranch herds. Limited Charolais animals on offer were in great demand and indicate that this breed will present a strong challenge to the more established Herefords, Sussex and Afrikanders.

African-owned cattle

Six hundred and sixty-seven weight and grade sales were held by the Ministry of Internal Affairs. Sales represented 3.3 per cent. of the African-owned herd. Admittedly this figure does not include sales to local butchers or the handful sent direct to C.S.C. abattoirs, but, even alowing a generous additional 1.5 per cent. for these our percentage agrees closely with the official Internal Affairs' figure of 5.1 per cent.

The number of cattle sold is even more depressing when compared to Internal Affairs' figure of losses due to poverty, cold weather and disease. Apart from quarter evil, deaths due to disease are negligible. In fact, we would be surprised if deaths from tick-borne disease and all specified diseases (excluding quarter evil) totalled more than a few hundred head.

Complicated as this marketing problem is with African tradition and custom, the need for draught-oxen, a mass of owners having too few animals to permit of intelligent culling, and a host of other difficulties, its solution is, nevertheless, fundamental to arresting progressive deterioration of the Tribal Trust Lands.

Sometimes the reason for not selling is unusual, as for instance the African who refused £51 for his ox but happily accepted £48 15s. at the next sale. His reason was that the animal belonged to his wife and the agreement was that he got the shillings and his wife got the pounds.

SPECIFIED DISEASES

Foot and mouth disease

The country has been most fortunate in remaining free from foot and mouth disease since August, 1967, and even that outbreak was confined to 1,104 head of cattle and 423 sheep on a single property.

Outbreaks have been reported by all neighbouring countries in the last two years, and the disease is currently active in some of these territories. Our freedom from invasion is largely due to strategic game and cattle fences on our borders, and to the intensive vaccination campaign carried out in recent years by Botswana.

Annual prophylactic vaccinations with SAT II type inactivated vaccine were given to 40,260 cattle on Liebig's Ranch—a property which was previously prone to outbreaks.

Rabies

We can once again report a pleasing but less spectacular decrease in confirmed cases of rabies. The record number of 224 cases diagnozed in 1966 has fallen annually to 165 (1967), 50 (1968) and 32 this year. The incidence in jackals over the same period has declined from 124 in 1966 to 78 (1967), 12 (1968) and nil this year. Unfortunately there is a small focus of infection in Viverridae near Bulawayo which accounts for the squirrel, mongoose and wild cat cases given below.

African	1	Meercat	2
Dog	13	Badger	2
Mongoose	6	Aardwolf	1
Domestic cats	3	Domestic pig	1
Squirrel	2	Wild cat	1
TOTAL	32		

Two specimens (not included in the above total) were received from Moçambique for confirmation—one dog and one bovine.

In view of the considerable challenge from the above rabid wild animals, the immunity in the dog population can be considered as very good. This is to be expected because, for the second successive year, the number of dogs vaccinated has exceeded 300,000. The 1968 total was 310,463 and this year only 308 less at 310,155.

Rabies vaccinations

District	European	African	Police dogs and cats	Total	Specimens	Positive
Salisbury	9,373	55,455	67	64,895	86	2
Bulawayo	10,266	44,707	—	54,973	73	12
Umtali	6,358	46,654	—	53,012	41	10
Gwelo	3,665	38,064	—	41,729	30	4
Victoria	1,431	53,178	—	54,609	12	3
Sinoia	1,275	11,299	—	12,574	5	—
Gwanda	248	14,954	—	15,202	1	—
Chipinga	492	12,669	—	13,161	11	1
TOTALS	33,108	276,980	67	310,155	259	32
1967–68	19,596	290,808	59	310,463	266	50

Total dogs vaccinated since 6.9.50, 2,905,980.
Total positive cases since 6.9.50, 1,508.

Contagious epididymitis and vaginitis

One thousand two hundred and forty-five bulls were clinically examined for testicular abnormalities and 28 condemned. Five properties remain in quarantine for this condition.

Lumpy skin

Mild cases occur sporadically in most provinces. There has been no evidence of the severe Neethling strain for some years.

African Swine Fever

There has been no recurrence of this condition since the slaughter, with compensation, of 771 African-owned pigs in a small border area in August, 1967.

Rift Valley Fever

A severe outbreak of Rift Valley Fever started in March, 1969, reached its peak in May and tailed-off by August. Conditions for transmission by mosquitoes were favoured by a good season, late rains and mild winter and susceptible livestock—the last recorded cases were in 1958.

Initially, sudden deaths in young cattle were reported from a group of farms near Salisbury. Some of these animals showed a severe haemorrhagic diarrhoea just before death. In others profuse haemorrhages into the bowel caused death before scouring developed. Abortions were conspicuous by their absence at this stage. In a matter of two to three weeks 80 out of 86 lambs died soon after birth on a farm in the same area. Thereafter abortions and sporadic deaths in cattle were increasingly reported from a considerable part of the Mashonaland Province. The disease was confirmed on a total of 139 farms, of which only 15 were not in Mashonaland.

It is not possible to accurately assess losses from the outbreak since many cows, possibly 10—20 per cent. on infected farms, aborted without evidence of illness. In each of two dairy herds, however, some 30—40 valuable cows died.

Mass vaccination of all cattle in the infected area with Rift Valley Fever vaccine was recommended, which, when used in advance of infection, proved very satisfactory. When used in the presence of active disease, however, abortions continued for some weeks. 1,193,900 doses of vaccine were sold between April and the end of September. We are greatly indebted to the staff

of Onderstepoort Laboratory for the high priority given to our requirements.

Anthrax

Our nil return for last year was marred by seven deaths on three farms. The following animals were vaccinated by departmental staff: 23,686 cattle, 261 sheep, 244 goats, 21 donkeys.

Tuberculosis

Imports tested, 301 cattle—reactors nil.
Exports tested, 459 cattle—reactors nil.

Dairy cattle

Since the early nineteen fifties a voluntary testing scheme has been in operation, and some 450 herds comprising 45,000 are either attested or under test. Approximately 40 per cent. of owners, however, declined to join the voluntary scheme. Government therefore agreed to the introduction of compulsory testing of all herds from which dairy produce is sold. Compensation for reactors detected is on a sliding scale:

Up to 5% reactors—30% compensation plus the value of the carcase.
5–15% reactors—40% compensation plus the value of the carcase.
15–20% reactors—50% compensation plus the value of the carcase.
Above 25% reactors—60% compensation plus the value of the carcase.

Owing to shortage of professional staff, testing was limited to 8,525 cattle in 79 herds, disclosing only two reactors positive on post mortem examination.

Ranch cattle

After a break of six years due to staff deficiency, testing was resumed on one large ranch which was known to be infected. Thirty thousand four hundred and seventeen head were tested revealing 123 reactors of which 78 showed lesions when slaughtered at an abattoir. The over-all percentage infection was 0.4 per cent. as compared to 0.12 per cent. when last tested in 1963.

Meat inspection incidence

Abattoir	*Percentage of carcases infected*				
	1968–69	1967–68	1966–67	1965–66	1964–65
Salisbury . .	0·0009	0·0028	0·009	Nil	0·0063
Bulawayo . .	0·0082	0·0015	0·0009	0·006	0·0083
Victoria . . .	0·0002	0·0005	0·006	0·0055	0·032
Umtali . . .	Nil	Nil	Nil	Nil	Nil

Of the 80 carcases found infected at Bulawayo abattoir 78 were tuberculin reactors from the ranch referred to above.

Brucellosis

Samples submitted to laboratories—serum, 12,192; foetus, 114; tampons, 3,135; positive to Contagious Abortion, 1,095 and 370 positive to Vibrio Foetus. These samples were of course suspected cases or follow up tests on positive findings. A more accurate indication of infection rates in the country as a whole is given by a random survey carried out during the year and which involved 19,288 blood sera:

Salisbury Province	0.5%
Bulawayo Province	1.7%
Victoria Province	5.1%
Umtali Province	1.8%
Chipinga District	3.8%
Gwanda District	5.2%

Of 7,095 milk samples tested at various centres 375 were positive.

Vibriosis

The significance of this disease as a factor in our infertility problem is unknown. One veterinary officer is studying this condition and will be submitting a thesis for his Master's degree.

Newcastle Disease

This disease was confirmed in African-owned poultry on the 19.9.68, as reported in my previous annual report.

Immediate measures were taken to effect a complete stand-still of all poultry and poultry products in the suspected districts. Road blocks were placed on main roads, and all vehicles—particularly African buses—were inspected. Poultry on infected properties were immediately slaughtered and compensation paid.

As soon as inspection teams had determined the extent of infection, vaccinating teams moved into the quarantine areas and vaccinated all poultry—the larger European-owned establishments inoculated their own birds. Two weeks later all birds were revaccinated. Only one major extension of infection occurred, which was due to a delegate to a religious convention transporting his dinner in the live state. No fresh outbreaks occurred after October. As a safety measure all birds in the affected African areas were revaccinated twice again in March, and restrictions were finally lifted in May.

The staff of Salisbury Province, with the aid of learner Animal Health Inspectors and African Veterinary Assistants carried out the initial control measures. They are commended for their hard and conscientious work which entailed many miles

of foot slogging from kraal to kraal in the Tribal Trust Lands, locating, confining and vaccinating the numerous flocks of fleet-footed birds. Without their thoroughness the disease could not have been controlled and eliminated so efficiently.

278,810 birds were vaccinated by Departmental staff and £151 19s. 6d. paid in compensation for the 2,758 poultry destroyed.

Other conditions encountered in poultry were:

Fowl typhoid: Minor sporadic incidence—7,866 birds blood tested—123 reactors on nine farms.

Fowl cholera: 12 outbreaks — 1,717 birds slaughtered—£273 3s. 0d. compensation paid.

Bacilliary white diarrhoea: 127,068 birds tested on 102 premises—123 reactors—all negative to culture.

Tick-borne diseases: Confirmed case of tick-borne diseases increased significantly in some instances.

	1969 deaths	*1968 deaths*
Theileriosis	36	254
Redwater	306	110
Gallsickness	577	160
Heartwater	67	18

Quarter evil: Confirmed cases 275, reported cases 1,029.

Enterotoxaemia: Confirmed cases. 107. Vaccination is widely practised but is frequently forgotten until deaths occur.

Johne's disease: Confirmed in two imported animals, which were immediately slaughtered.

Botulism: 41 deaths recorded on 13 properties, the use of vaccine has reduced mortality in affected areas.

Veld poisonings: 1,516 deaths reported of which 735 were due to Umkauzaan *(Dichapetalum cymosum)*.

Mineral poisonings: 1,073 deaths of which 673 were caused by arsenic.

Blood smears examined:

Trypanosomiasis	5,356
Anaplasmosis	270
Redwater	213
Theileriosis	9
Quarter Evil	74
Anthrax	5
Spirochaetosis	3
Heartwater	15
Miscellaneous	17
Negative	194,675
Total	200,637

Post Mortem Examinations—Field Staff

	Bovine	Ovine	Porcine	Poultry	Faeces	Miscellaneous	Total
Salisbury	277	364	32	14	693	36	723
Bulawayo	72	107	89	786	273	171	1,225
Umtali	76	51	13	37	124	11	188
Gwelo	258	114	30	89	972	28	519
Victoria	36	23	13	35	445	2	109
Sinoia	75	114	8	42	319	3	242
Gwanda	20	6	11	1	43	2	40
Chipinga	84	23	2	31	582	1	141
TOTALS	898	802	198	1,035	3,451	254	3,187

Trypanosomiasis

Once again the disease was well controlled in all areas by the use of drugs, holding the position whilst the tsetse front is stabilized prior to advancing into the heavily infested areas.

In the north-west the position was held and no recurrence of the serious threat to Wankie National Park has taken place. In Gokwe-Gatooma, the salient north of the Umfuli River, in the Umfuli Tribal Trust Land appears to have been obliterated. East of the Umniati in Sanyati Tribal Trust Land and Chenjiri Purchase Area only minor disease foci remain.

In the central Zambezi area a fall in the incidence of disease in Vuti has been noted with little change elsewhere. There is no change in the position in North Lomagundi or Sipolilo, but a serious outbreak has continued and extended in the Chimanda area of Mount Darwin.

A further improvement is noted in the Mtoko/Inyanga area.

In the south-east there were extensions in both the border area of the Umzelezwe drainage and the residual *Glossina pallidipes* focus on the Sabi. These now appear to be controlled. West of the Sabi in Chiredzi District only Humani Ranch produced cases, Sangwe Tribal Trust Land remaining free.

In Nuanetsi District no infection was recorded from Matibi II Tribal Trust Land, the only cases of trypanosomiasis being at low level in the Gonare-Zhou test herds.

Cattle exposed	446,030
Blood smears examined	146,285
Infections: T. congolense	4,048
T. vivax	1,182
T. brucei	47
Mixed	79
Total	5,356
Treatments: Iso-metamidium	71,376
Berenil	47,577
Others	2,401
Total	121,354

Summary of Tsetse Control

The full report of the Assistant Director of Veterinary Services (Tsetse and Trypanosomiasis Control) is available as a separate issue.

This has been a year of steady achievement, measured in terms of improved planning and efficiency in control operations, of the general reduction in the total number of trypanosomiasis cases, and, what can be regarded as a promise of future policy, of the attempt at reclaiming an uninhabited area from tsetse fly for the purpose of settling people with their cattle.

The improved trypanosomiasis situation is indicated in Fig. 1 which shows the progress of the disease in cattle since 1958. The incidence of the disease is seasonal, showing peaks usually in the quarter April-June, coinciding with the appearance of peake *G. morsitans* populations. When shooting game as a means of controlling *G. morsitans* ceased in 1960 the recorded cases increased. The introduction of selective shooting (shooting the favoured hosts warthog, bushpig, kudu and bushbuck within fenced areas) was followed by a sharp decline in the incidence of disease. The suspension of shooting as a means of control in late 1965 and its very gradual resumption until mid-1967, was accompanied by a further rapid increase in cases to an unprecedented peak in April-June, 1967, since when control measures have again exerted their effect. The seasonal peaks of 1968 and 1969 have declined progressively.

Captures of tsetse flies at 75 traffic control gates and barriers on roads leaving fly infested country also show a satisfying decrease. The total numbers recovered were 23,398 *G. morsitans* and 92 *G. pallidipes* compared with 49,469 and 141 respectively for last year. Taken together, these facts indicate a general improvement in the tsetse and trypanosomiasis position.

The very strenuous effort put into the 1968 insecticide spraying operation, in which the tsetse habitat within 4,190 square miles was treated with a five per cent. DDT suspension, was rewarded with satisfactory success in most areas. Some disappointments were experienced, however, in the Sabi-Lundi-Limpopo drainages where an unusual ecological situation was encountered, calling for a modified method of insecticide application. The 1969 operation covered 4,210 square miles of tsetse habitat.

Selective hunting operations continued satisfactorily in all areas without interruption. The areas covered do not hold a large population of game, and special techniques are being developed to seek out the reduced numbers of kudu, bushbuck, warthog and bushpig still present.

The Wankie District has remained free of trypanosomiasis throughout the year, following the control operations carried out during 1967 and the partial operation of 1968. The appearance since January, 1969, of a few cases of trypanosomiasis at the cattle centres within the area of Binga District sprayed during 1967 and 1968 made it advisable during 1969 to extend the treatment to denser tsetse areas to the north and east of these centres.

The Gokwe-Sanyati area continues to be critical. Control operations are hampered by the large numbers of stock, cattle, sheep, goats and donkeys throughout the area. It is no mean achievement to have arrested the eastward spread of trypanosomiasis in this area and to be able to contemplate seriously its ultimate elimination.

The continued and increasing occurrence of trypanosomiasis in Urungwe District, particularly within the Vuti Block and the north Karoi European farms warranted a further intensive insecticide treatment of part of the Rekomitjie, Charara and Naodza drainage. Operations are still in progress.

Trypanosomiasis in the Mtoko District remains quiescent and in Inyanga North the only persistent appearance of cases occurs within the central area, mainly at Samakande. The position has greatly improved since the extensive spraying operations in 1967 and 1968. The 1969 spraying operations should further consolidate these gains.

Although only one case of trypanosomiasis occurred on the European farms adjoining the international border in Chipinga District, there has been a serious increase in the incidence of the disease on a few farms and at African centres associated with the Umselezwe drainages and also those associated with the Sabi River, sufficient to warrant a spraying operation to cover the affected areas, and extending over part of Humani Ranch on the west bank of the Sabi, in Bikita District, where cases persisted for several months. Elsewhere, in Chiredzi and Nuanetsi Districts, the position is very satisfactory. No cases have occurred in Sangwe Tribal Trust Land or Matibi II Tribal Trust Land for over a pear, and the only cases recorded from Nuanetsi District were from the department's test herds situated along the

Moçambique border, south of the Lundi River. No tsetse flies have been taken at any traffic control points within the Sabi-Lundi area, or on the cycle flyrounds of the Lundi. Apart from two captures of *G. morsitans* on the international border only small numbers of tsetse have been taken monthly on the cycle and bait ox flygrounds south of the Lundi, and during September a nil catch was recorded from the cycle flyrounds for the first time ever.

The international insecticide spraying operations and the maintenance of selective hunting operations in the protective fenced barriers between the Gona-re-Zhou and the cattle occupied areas of Chiredzi and Nuanetsi districts have succeeded in eliminating the tsetse fly from an area of about 1,000 square miles, so that spraying operations this year covered only about 190 square miles in Rhodesia, but over 400 square miles within Moçambique.

It is our intention to remove tsetse flies so far from our borders that they will no longer pose a threat to this part of Rhodesia. During the 1968 spraying campaign in this border area an unusual ecological situation was encountered in heavily infested tsetse areas to which the conventional method of treating riverine vegetation, vlei edges and vegetation "contacts" was inapplicable. Resort was made to marking and cutting a system of grid lines, spaced 400 yards apart, along which insecticide was applied to the boles of trees of diameter 6 inches or more. A 5 per cent. DDT suspension was applied, which was a departure from the 1967 operation when a 3.1 per cent. Dieldrin emulsion was used. Access in this nondescript area was almost non-existent and consequently there was little information available of the distribution or magnitude of the tsetse population before treatment. The 1968 spraying operation in this area failed to eliminate the resident tsetse, and it may not have brought about even a reduction in their numbers. It was not possible to determine with any confidence whether the DDT wettable powder was less effective that the previously used Dieldrin or whether the lack of success was due to the modified spraying technique. Both factors may have been responsible. It was, therefore, decided to compare the performance of these two insecticides during the 1969 campaign under similar conditions of application and terrain. In these large-scale tests, the grid lines were marked at 700-foot intervals, and the spray operators applied insecticide to those places where tsetse flies would be compelled to find refuge during hot dry periods. This nondescript area surrounds the international border, and it is imperative that an effective treatment is devised without delay. The current operations should indicate a solution to the problem.

The blood meal identification laboratory was formally opened on 3rd October, 1968, by the Secretary for Agriculture, Mr. R. A. Griffith.

In 1969 a meeting of the Interterritorial Standing Committee for Tsetse and Trypanosomiasis Control in South-East Africa was held in Salisbury between 28th April and 1st May, to which observers from Angola, Botswana and South-West Africa were invited in addition to the representatives from the Republic of South Africa, Moçambique and Rhodesia. The formal business was followed by a symposium on tsetse and trypanosomiasis problems of mutual interest.

RESEARCH

Veterinary research

The routine observations on cattle, sheep, pigs and goats under prolonged prophylaxis and under constant trypanosome challenge continue at Lusulu and Rekomitjie Field Research Stations.

Tsetse research

Comparative treatments have been given to areas of tsetse habitat within the Zambezi Valley to determine the efficacy of 5 per cent. DDT wettable powder in reducing tsetse fly populations under different methods of application. Treatment was given—

(a) by the conventional method of applying insecticide to the boles of trees of over six inches diameter, to horizontal branches, fallen logs, holes in trees and antbear holes within denser riverine vegetation, vlei edges and vegetation contact zones;

(b) to the boles of rough barked trees of six inches or more in diameter found along the paths of a grid system spaced at 423 yards intervals within uniform nondescript habitat; and

(c) to those situations along a similar grid within similar nondescript habitat such as boles of rought barked trees, holes in trees, fallen logs and antbear holes where tsetse could be expected to retire during hot dry days. The treatments are not yet completed.

It has long been established that warthogs are particularly attractive to *G. morsitans*. Investigations are in progress to determine the attributes of warthogs that make them attractive, and other animals, like impala, unattractive. Model animals, traps and metal drums of various shapes and configurations, set stationary and moving have been found to have differential attractiveness to *G. morsitans*. The use of sticky substances in conjunction with these artificial attractants greatly increases the numbers of flies recorded, compared with the conventional capture by a hand-net, and also increases the percentage of female flies in the catch. This is an important observation that will make it necessary to reconsider conclusions about tsetse populations based on the conventional methods of recording tsetse flies.

As samples of new insecticides become available from the manufacturers and distributors they are screened for possible use against tsetse flies, using the performance of DDT and Dieldrin as a standard. So far none has been found to be an improvement on DDT or Dieldrin, but some have been found to offer some promise as an application to the coats of cattle.

VETERINARY RESEARCH BRANCH

Staff and accommodation difficulties have been referred to earlier in this report under these respective headings.

Diagnostic and preventable services continued at a high level as indicated by the following figures.

Post mortem Examinations

Poultry	4,071
Cattle	66
Sheep	187
Pigs	89
Chinchilla	250
Rabbits	88
Others	86

Foetal Samples

Cattle	364
Sheep	40
Others	6

Miscellaneous

Rabies Specimens	259
Blood Samples	34,422
Tampons (Vibrio Foetus)	3,678
Milk Samples	1,564
Faecal Samples	703
C.S.C. and Colcom Specimens	719
Miscellaneous (includes histological, haematological and biochemical)	6,346

This necessitated the undertaking of such examinations as:

Bacteriological	6,149
Histological	1,478
Haematological	2,526
Biochemical	1,012
Faecal egg examinations	645

and the re-distribution for further examination to the following:

Chief Chemist	254
Government Analyst	8
Plant Pathologist	15
Chief Botanist	19
Onderstepoort Laboratory	239

VACCINES SOLD

	Doses sold		
	1969	1968	1967
Anthrax	62,400	117,300	225,500
Bluetongue	97,450	56,500	50,650
Brucella Rev I	1,750	1,700	1,500
Calf Paratyphoid	10,946	10,186	8,841
Contagious Abortion	180,359	197,308	132,028
Enterotoxaemia	155,050	132,950	122,900
Fowl Pox	421,200	388,200	393,800
Fowl Typhoid	21,200	20,100	39,300
Gallsickness	11,895	17,969	14,942
Redwater/Gallsickness	13,161	14,136	13,012
Horse Sickness	7,084	5 866	7,510
Lumpy Skin	Nil	1,980	372
Quarter Evil	471,365	703,390	482,220
Quarter Evil/M. oedema	1,580	43,090	42,740
Quarter Evil ex Onderstepoort	30,300	—	—
Lamsiekte/Botulism	59,050	71,150	40,970
Lamb Dysentery	300	450	300
Newcastle Disease	1,377,258	109,400	230,100
Tetanus	200	200	Nil
Heartwater	16	32	Nil
Rift Valley Fever	1,193,900	—	—
TOTAL DOSES	4,116,464	1,891,907	1,806,685

Wildlife research

Investigation into the role played by wildlife as reservoirs of disease continued. Oesophageal probang samples were taken from cattle and game, and tend to confirm our opinion that the so-called "carrier" state of animals harbouring minute quantities of foot and mouth virus in their throats is of no practical significance in initiating outbreaks of this disease. Results agree with certain findings in a neighbouring territory in that:

A. The highest serum antibody levels in a particular beast do not necessarily correspond with the virus type isolated from that animal.

B. Type SAT III foot and mouth virus was isolated from game although this particular type has not been confirmed in the country for 15 years.

C. All three South African types of foot and mouth virus have been isolated from a single herd of buffalo.

Brucella abortus was isolated from an aborted foetus of a waterbuck.

Schistosomiasis

Clinical outbreaks in sheep were not evident this year. As yet there is no means of determining the sub-clinical effects of this parasite. One veterinary officer has been granted special leave to study this problem as his subject for a Ph.D. degree at the University College of Rhodesia.

MEAT INSPECTION

Slaughterings

The expected increase in cattle slaughterings did not materialize, largely due to very low kills during the December/January period. The C.S.C.'s chiller incentive scheme this year should boost production during these lean months, and turn the graph upwards again. The sheep and pig graphs have levelled off somewhat, but the goat kill has doubled for the second year in succession, with a considerable contribution from West Nicholson.

Regular sampling of working surfaces, rooms, handlers and meat itself has continued at all major abattoirs. Well over 4,000 samples of varying nature have been screened for salmonellas, with a total of only 16 isolations as follows:

Paunch drain, 1; casings receiver, 2; bovine gall bladders, 1; bile receiver, 6 (isolates from two positive samples); sewer, 3; rectal swabs, 2; meat and bone meal, 1.

Several major surveys have been possible and summarized results show:

(a) *Fluke survey* (mainly Matabeleland)—73 per cent. of cattle and 99 per cent. of farms are infected with Paramphistomes; 63 per cent. of cattle and 91 per cent. of farms are infected with Schistomes; 20 per cent of cattle and 51 per cent. of farms are infected with Fasciola; 18 per cent. of cattle farmers dose for liver fluke.

(b) *Cows slaughtered while pregnant*—57 per cent. of cows are sent for slaughter while in calf, of which more than half are more than three months pregnant.

(c) An extensive survey of the bacteriological status of the boning room and all its contents, with comparative data on alternative cleaning methods and frequencies is nearing completion, and will result in factually based recommendations for standard meat hygiene practices under Rhodesian conditions.

Weekly reports on contamination levels and cleansing achievements are meanwhile being submitted to relevant C.S.C. Branch Managers.

Legislation

Considerable evidence has been built up over the years concerning the distribution and numbers of bovine measles cysts in infected carcases, and a detailed survey of nearly 2,000 measly carcases this year has confirmed that the measles regulations would benefit by a change. In addition, overseas reports on the survival time of cysts at different freezing temperatures prompted trials in Bulawayo which confirmed German findings. The availability of modern rapid freezing techniques in Rhodesia is a further factor which has prompted a review of the measles regulations currently under way.

Measles

A small decrease in pigs condemned for measles and sarcocysts has been noted. This slight reduction in the over-all incidence is most gratifying as it unmistakeably indicates an increasing number of good quality and intensively reared pigs coming from African producers.

The over-all incidence in sty-pigs is approximately 0.02 per cent. and in free range pigs 3.47 per cent.

The incidence of beef measles is surprisingly also lower than last year, with Bulawayo being the exception where an increase in the number of cases was found. Fort Victoria figures showed an appreciable drop which may be due to better control of taeniasis in the Midlands or to the opening of the Que Que Municipal abattoir.

Liver Fluke (F. gigantica)

The failure of most Rhodesian cattle producers to control this parasite by methods available is amply shown by the dramatic rise in the number of livers in which the parasite was found over the last two years at C.S.C. abattoirs (i.e. a rise of

over 50 per cent. of affected livers). The weight of liver necessarily condemned for this preventable condition is of great economic significance.

Tuberculosis

Infection was found in a total of only 82 bovine carcases. This infection was generalized in only 20 cases—the remainder of 62 showing only localized lesions. Of the above cases 78 were detected in cattle from one ranch which had reacted to the tuberculin test and sent to the C.S.C. abattoirs for slaughter.

The over-all incidence in the country is very low indeed.

Liaison has been established with the Mpilo Hospital chest unit who are anxious to get animal lesions for typing. Amongst those successfully cultured so far is a suspect human type bacillus from one of the reactor cows showing typical tuberculosis lesions.

Stilesia hepatica

It is not a matter for congratulations that the sheep liver condemnations for this parasite have finally reached the 90 per cent. level particularly in view of the fact that there has been at least one remedy available for over two years.

The relatively low incidence of Stilesia in cattle continues to grow insidiously and now involves one liver in every 200.

Pyaemia in Pigs

An increase in the incidence of pyaemia in pigs was observed—this being due to tail biting which has been fairly prevalent in the Salisbury area.

Emaciation and oedema in goats

Despite a big increase in goat slaughterings the number of condemned for emaciation with oedema is much lower and the majority of cases occurred at West Nicholson.

Hydatidosis

The number of cases of hydatidosis shows a small decrease. Cattle were the only species affected in all centres except Bulawayo where a high proportion of pigs slaughtered are African-owned. Fifteen lung and three liver infestations were found in pigs, and three lung infestations in sheep.

Mycobacterial lymphadenitis (tuberculosis-like lesions)

Incidence: 1 case per 5,762 pigs.

It is hoped that typing of selected lesions at Impilo will produce more accurate information regarding the actual mycobacteria responsible for this condition.

Traumatism

Only 61 carcasses, 195 quarters and 373 limbs were condemned during the year. This low figure could well be borne in mind by producers when making complaints about the Railways — the C.S.C. — Meat Inspectors and Graders and more particularly so in the light of remarks made above on liver fluke condemnations.

Animals dead on arrival

Centre	*Cattle*	*Sheep and Goats*	*Pigs*
Salisbury	5	2	102
Bulawayo	17	21	17
Victoria	—	1	—
Umtali	—	2	1
TOTAL	22	26	120
1967-1968	17	16	124

These figures confirm the accepted contention that pigs are the worst travellers, and the majority of deaths were due to one or other manifestation of travel stress in this species.

Gatooma C.S.C. abattoir

Construction is well advanced for the new Cold Storage Commission abattoir at Gatooma, which is scheduled to open in July, 1970.

Acknowledgements

I would like to acknowledge, with thanks, the collaboration and assistance we have had from other sectors of the Government Service, especially the Ministry of Internal Affairs, the Police, the Department of National Parks and Wild Life Management, and not least officials in our own Ministry.

To my own staff I express my sincere appreciation of their conscientious devotion to duty.

J. M. WILLIAMSON,
Director of Veterinary Services.

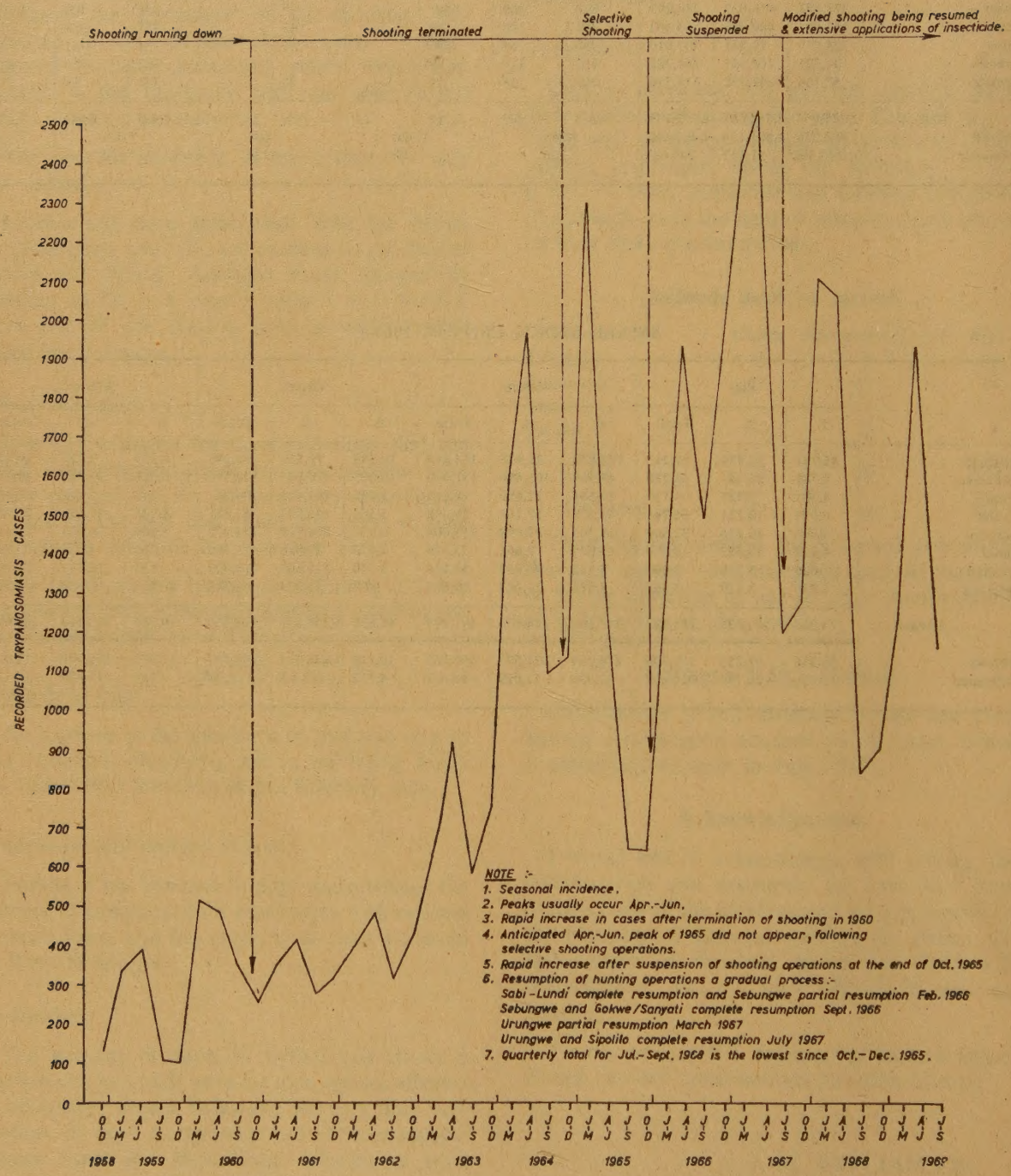
CENSUS OF CATTLE AND DIPPING TANKS, 1968-69

District	European-owned cattle	African-owned cattle	Total cattle cattle	Dip tanks		Power sprays		Hand sprays		Total appliances		Total appliances
				E	A	E	A	E	A	E	A	
Salisbury	706,334	513,725	1,220,059	1,378	273	717	3	199	6	2,294	282	2,576
Bulawayo	394,915	471,975	866,890	826	299	81	3	79	—	986	302	1,288
Umtali	120,300	364,831	485,131	371	186	98	15	39	—	508	201	709
Gwelo	371,472	416,827	788,299	860	300	101	—	39	—	1,000	300	1,300
Victoria	253,093	480,369	733,462	390	326	49	—	42	3	481	329	810
Sinoia	224,539	79,271	303,810	392	57	292	2	41	2	725	61	786
Gwanda	97,221	164,561	261,782	152	120	9	—	—	—	161	120	281
Chipinga	57,184	61,132	118,316	204	48	22	—	20	—	246	48	294
TOTALS	2,225,058	2,552,691	4,777,749	4,573	1,609	1,369	23	459	11	6,401	1,643	8,044
1967–68	1,980,556	2,501,134	4,481,690	5,946		1,326		604		7,876		7,708
Difference	+244,502	+51,557	+296,059	+236		+66		−134		+168		+168

SMALL STOCK CENSUS, 1968–69

	Pigs			Sheep			Goats			Equines		
	E	A	Total	E	A	Total	E	A	Total	E	A	Total
Salisbury	46,781	32,434	79,215	122,870	21,975	144,845	10,689	79,556	90,245	3,255	7,219	10,474
Bulawayo	5,789	26,441	32,230	45,564	105,476	151,040	10,203	420,563	430,766	2,626	36,728	39,354
Umtali	4,301	5,437	9,738	19,541	52,689	72,230	2,788	101,425	104,213	547	1,778	2,325
Gwelo	6,075	10,721	16,796	41,323	37,165	78,488	3,565	143,806	147,371	1,721	25,189	26,910
Victoria	4,093	18,216	22,309	27,305	87,699	115,004	9,956	214,419	224,375	1,208	14,603	15,811
Sinoia	4,958	13,322	18,280	43,675	9,661	53,336	3,570	27,816	31,386	742	4,974	5,716
Gwanda	628	3,336	3,964	8,332	48,852	57,184	5,740	116,669	122,409	432	16,763	17,195
Chipinga	1,336	2,129	3,465	8,583	11,083	19,666	179	52,609	52,788	258	6,056	6,314
TOTALS	73,961	112,036	185,997	317,193	374,600	691,793	46,690	1,156,863	1,203,553	10,789	113,310	124,099
1967–68	68,335	91,255	159,590	274,204	321,581	595,785	42,118	1,041,727	1,083,845	11,075	101,901	112,976
Difference	+5,626	+20,781	+26,407	+42,989	+53,019	+96,008	+4,572	+115,136	+119,708	−286	+11,409	+11,123

Fig. 1 : TOTAL TRYPANOSOMIASIS CASES 1958 – 1969 (QUARTERLY FIGURES)


Shooting running down
Shooting terminated
Selective Shooting
Shooting Suspended
Modified shooting being resumed & extensive applications of insecticide.
RECORDED TRYPANOSOMIASIS CASES
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
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